CONTRACTOR'S REMEDIAL ACTION WORK PLAN

METAL BANK PROJECT
PHILADELPHIA, PENNSYLVANIA

Submitted by:

NIAGARA FALLS, NEW YORK
6/26/2009

TABLE OF CONTENTS

Appendices:

BACKGROUND

Presented herein are the Sevenson Environmental Services (Sevenson) Work Plans for the remaining work at the Metal Bank Site. Also, included is the summary of changes to the RAWP and Design Drawings originally prepared by AMEC and TetraTech EC (TtEC), respectively in April 2008 and previously approved by EPA. In the event of a conflict, these Sevenson Environmental Service Work Plans supersede the EPA approved RAWP document of April 4, 2008 developed by Tetra Tech EC and AMEC.

ACCEPTANCES/ REJECTIONS TO TtEC's REMEDIAL ACTION WORK PLAN

SEVENSON ENVIRONMENTAL SERVICES

ACCEPTANCES/ REJECTIONS TO TetraTech EC's REMEDIAL ACTION WORK PLAN

SECTION	TITLE OF SPEC SECTION	ACCEPT	ACCEPT WITH COMMENTS	REJECT and REPLACE WITH SES PLAN	Not Applicable / Completed
5.1	Proposed Design Modifications During Implementation				X
5.2	Preconstruction Activities				X
5.2.2	Permits and Equivalencies	X			
5.2.2	Submissions of Sub Contractors Qualifications	X			
5.2.3	Notifications				X
5.3	Meetings	X			
5.3.1	Pre-Construction Conference				X
5.3.2	Routine Meetings	X			
5.4.1	Mobilization		X Accepted with the exception of revisions in sections 5.4.1.6 & 5.4.1.		
5.4.1.6	Construction Water Management Plan		X Sevenson requests continuous treatment and discharge in lieu of batch treatment.		
5.4.1.8	Access Road Construction			X	
5.4.2	Power Washing and Sealing Floor in Building 7	X			
5.4.3	Sheet Pile Installation and Monitoring		X SES would like to reject the installation portion of the plan, which has been addressed in the SES work plan, and accept the monitoring portion of the plan with the exception that item #3 of section 5.4.3.2 be revised. SES would like to replace a PA licensed land surveyor with a competent person to perform daily monitoring.	X	
5.4.4	Excavation and Earthwork Plan	X			
5.4.5	Sediment Excavation Plan			X	
5.4.6	Sub Aqueous Cap Installation Plan			X	
5.4.7	Soil and Debris Management Plan	X			
5.4.8	UST Closure / Removal				X
5.4.9	Floatable Oil / LNAPL Monitoring Plan	X			
5.4.10	Monitoring Well Installation Plan		X With Approved Sevenson Subcontractors		
5.5.1	Pre-Certification Inspection and Demobilization	X			
5.5.2	As-Built Drawings	X			
5.5.3	Final Construction Documentation	X			
Appendix E	Final Construction Quality Control Plan		X Sevenson has reviewed the Final QC Plan and generally accepts the plan with the following changes: 1.) Name of Contractor 2.) Names and qualifications of Key Personnel 3.) Contractors Name on Inspection Forms 4.) Format of the Contractor Daily Construction Report		

SEVENSON ENVIRONMENTAL SERVICES

ACCEPTANCE OF ENGINEERING DRAWINGS

SHEET NUMBER	ACCEPT	REVISE WITH COMMENT	NOT RELEVANT	COMMENTS
1	X			
2		X		GENERAL NOTE # 4 ….REVISE TO STATE THAT SES WILL ASSIST ONLY IN GETTING PERMITS
3	X			
4	X			
5	X			
6		X		TIDE CHART APPEARS TO BE INACCURATE (SES ASSUMES MUDFLATS ARE DRY @ MLW), ALSO GENERAL NOTE # 1 IS UNACCEPTABLE
7	X			
8			X	
9			X	
10			X	
11			X	
12			X	
13		X		NUMBER OF SUMPS MAY BE INACCURATE
14	X			
15		X		UNSURE OF EXISTING GRADES AND SUBSEQUENT CUTS / FILLS
16			X	DRAWING NUMBER 16 HAS BEEN DELETED
17	X			
18	X			
19			X	
20			X	
21		X		ASSUMES GW ELEVATION IS AS SHOWN
22			X	
23	X			
24	X			
25		X		SEVERAL NOTES MAY REQUIRE REVISIONS DUE TO APPLICABILITY
26	X			
27			X	
28	X			TANK PORTION NOT APPLICABLE
29		X		ASSUMES GW ELEVATION IS ACCURATE (MINUS 12 FEET FROM EXISTING GRADE)

30	X			
31		X		ASSUMES EXISTING GRADE IS ACCURATE
32	X			
33	X			
34	X			
35	X			
36	X			
37	X			
38	X			
39	X			
40	X			
41			X	
42		X		WILL BE PER MANUFACTURERS SUGGESTED METHODS FOR MATTRESS CONNECTIONS
43		X		WILL BE PER MANUFACTURERS SUGGESTED METHODS FOR CURTAINS
44			X	
45	X			
46	X			
47	X			
48			X	WWTP WILL BE GENERALLY THE SAME AS WAS PREVIOUSLY UTILIZED
49			X	WWTP WILL BE GENERALLY THE SAME AS WAS PREVIOUSLY UTILIZED

Soil Erosion and Sediment Control Plan

A. Purpose

The soil erosion and sediment control measures described herein are designed based on a two-step approach, minimizing erosion and controlling transport of sediment.

1. Erosion will be minimized by:

- Minimize exposure of bare soil;
- Preserve existing vegetative cover wherever possible;
- Divert run-on water away from disturbed areas;
- Stabilize disturbed areas promptly after final grading.

2. Transport of sediment will be controlled by:

- Prevent soil from leaving the site through the use of silt fences, straw bales will be inserted along the silt fence as required and staked into the ground as necessary);
- Keep runoff velocities low. This can be done by strategically placing stone check dams or other controls as needed.
- Reduce sedimentation by utilizing erosion control practices on site.

B. Plan Implementation

All erosion and sediment controls will be put into effect and be functional prior to commencement of any continuation of earthwork activities. Once in place, Sevenson shall be responsible for the inspection of all control measures daily and after storms of .5" of rain or more over a 24-hour period. Inspections will be performed and sediment will be removed from the upstream side of the silt fence once the accumulation reaches 6 inches or sooner, if needed. Any items found noncompliant with this plan will either be repaired or replaced immediately. The Quality Control Manager has the authority to stop work until these repairs are completed. The QCM will also maintain a log of his inspections and a list of deficiencies found, and the corrective action(s) taken.

C. Plan Components

Prior to performing any intrusive work at the site, Sevenson shall install temporary erosion and sediment control measures as specified. New Silt fencing will be used to minimize the transport of sediment in storm water runoff. New Super-silt fencing will be installed between rows of existing vegetation and along the perimeter of the down gradient portion of the site, at the top of the slope. Sevenson will install new Super-silt fencing on the riverside of the site to prevent the possibility of potential PCB impacted runoff. Sevenson will place the bottom 6 inches of the silt fence fabric in a shallow trench and covered with soil to prevent migration. Siltation and erosion control practices will be consistent with currently acceptable practices, including the placement of new silt fencing and erosion control tubes to mitigate sedimentation transport; the use of berms and trenches to re-direct surface water run-off/run-on to prevent contamination of adjacent properties; and the use of oil absorbent booms, where applicable, to prevent the flow of contaminated liquids from entering navigable waterways and/or storm sewer pathways (See Figure 1).

Figure 1:

In areas where the water channels, Sevenson will place straw bales in front of the silt fence to reduce stress on the silt fence and aid in collecting sediments. In areas where straw bales have been previously placed by TetraTech EC and are no longer effective, Sevenson will replace with erosion control tubes. Any piece of equipment coming into contact with contaminated soils will be decontaminated with a pressure washer at the equipment decontamination station located inside the contamination reduction zone (CRZ). The CRZ shall be an area located adjacent to the exclusionary zone. Equipment that comes into direct contact of impacted material shall be deemed contaminated. The Site Health and Safety Officer shall designate the exclusionary zone. As the contaminated piece of equipment exits the exclusionary zone it shall enter the contamination reduction zone (CRZ).

D. Turbidity Monitoring

In accordance with section 02900 of the specifications, in the event that turbidity readings outside the turbidity curtain exceed 40 NTUs or 20% more than the background turbidity value (whichever is greater), Sevenson will modify remedial activities per the decision matrix presented in the March 5, 2009 EPA meeting and revised to meet EPA comments on March 24, 2009. Action will also be taken if a visible turbidity plume, attributable to the work operations is observed more than 100 feet from the active operation and outside

the turbidity curtain. Sevenson will notify the onsite Engineer or applicable party immediately if any of the conditions are noticed during the working hours. Water samples will be collected inside and outside of the turbidity curtain in the impacted area for PCBs and Total Suspended Solids (TSS) Analysis in the event that a 100' long plume is seen outside the sheeting and is a direct result of site activity. .

1. ***Monitoring Equipment***

   The turbidity monitoring, new locations reflective of US EPA suggestions of December 18, 2008, will be performed using four fixed NexSens OBS-3 Turbidity Monitors or similar (See Figure 2) consisting of one proposed upstream turbidity monitor, One upstream work zone turbidity monitor, one downstream work zone turbidity monitor and one downstream background turbidity monitor. The monitors will be positioned in the exact location of the coordinates that are received from the EPA.

Figure 2:

The NexSens turbidity monitors meet the performance criteria as established by USEPA method 180.1. The first upstream turbidity monitors will be 1 mile upstream and placed within 100-300 ft. offshore to measure the real-time background turbidity level. The location will be on the same side of the river as the site, in the main flow of the river outside of the tidal influence of the site vicinity. The proposed upstream work zone, downstream work zone and background location proposed by the EPA

(December 18, 2008) and will serve as the outline for the NexSens OBS-3 locations onsite. Sevenson will perform background monitoring 7 days in advance before the start of the sediment excavation/dredging. This data will be used to establish a background level suitable for the project and will set the standard for any exceedances onsite. Real time turbidity monitoring shall continue throughout the duration of sediment excavation to verify the effectiveness of controls. Real time monitoring data at three locations will be collected and compared to data collected from a background point outside of the work area. If turbidity monitoring data in the work zone exceeds background parameters as specified in the Construction Specifications 01411, work processes will be evaluated and adjusted, or may be suspended, if necessary, until an effective modification can be implemented.

Each monitor will be calibrated based on the manufacturers' recommendations which will include preventative maintenance precautions, trouble shooting, and the calibration schedule. In the event that the deployed turbidity monitors are producing skewed results and visual turbidity is present in around the work area, Sevenson will utilize a hand held turbidity monitor to obtain data. Sevenson will inspect the deployed meters and clean and recalibrate if necessary.

During Excavation/Backfill and Sub-Aqueous Cap Placement Operations, monitoring shall commence 30 minutes prior to start of the day's work and stop when excavation operations cease for the day. The sample frequency shall be one data point every 3 minutes. This data point shall be the average of the previous 3 minutes. The NexSens turbidity monitors will be set 3 feet from the river bottom, which eliminates insignificant, naturally occurring turbidity, while allowing construction related turbidity to be detected. If the action levels relative to the background turbidity value are exceeded during the excavation/dredging phase of the operation, Sevenson will take immediate action to reduce the amount of sediment being re-suspended. Further sampling and field actions will be taken as as per section 02900 of the specifications and stated in the turbidity decision matrix presented in Appendix C. Turbidity monitoring will be conducted during placement of capping material to monitor for resuspension of sediments into the river.

E. Turbidity Controls

Due to the projected current of the Delaware River displaying velocities greater than two (2) to three (3) feet per second, which are above Sevenson's recommended threshold to install silt curtains as the primary form of turbidity containment, Sevenson will maintain control of turbidity during the excavation and backfill operations of the deep and tidal transition zones utilizing a temporary sheet pile wall or turbidity wall (See Temporary Sheet Pile Installation and Removal Plan included in this document) as the primary containment for turbidity in the work area. Sevenson will also install turbidity curtains with oil absorbent boom located outboard of the sheet pile wall as means of secondary containment. As the oil saturated boom is replaced and removed, it will be handled in a manner that will not contaminate any areas that have been deemed clean. This saturated oil boom will be placed in a lugger box and be properly disposed of. The silt curtains will be installed and adjusted with skiffs on the water. To control sediment resuspension and prevent cross contamination between the "clean" and "dirty" work sections as sediment removal and backfilling proceeds, lateral curtains will be installed that will divide active work areas from adjacent areas or previously remediated areas from other areas that still need to be completed.

Turbidity curtains will be deployed outside the temporary sheet pile wall along with solid oil boom, and absorbent boom. Around the mud flats, super silt fence will be installed to height of which will be above the high tide line. Outside the super silt fence, turbidity curtain and absorbent oil boom will also be installed as a secondary measure of protection. (See Appendix D) Local Turbidity Curtains will be constructed of a medium strength material designed to withstand mild wind, waves, and current. Local turbidity curtains will be deployed around the limits of each of the excavation areas during sediment removal activities and also around the work area during the initial installation and removal of the temporary sheet pile wall. All excavation operations will be ceased prior to the opening of any turbidity curtain onsite.

Turbidity controls will be deployed prior to any sheet pile or excavation activities take place. Curtains will be lased together on shore and pulled into the waterway with work boats. The work boats will tow the curtain into position were it will be anchored in position. After the curtain has been anchored the skirting will be released. At this point

the curtain will be functional. Oil boom will then be deployed along the alignment of the curtain. Oil booms will be inspected daily and replaced when they have become oil soaked. Booms that have been removed from the waterway will be transported to shore and staged for proper off site disposal. Turbidity curtain will also be inspected by the quality control manager at a minimum frequency of twice a day and the results of each inspection will be noted in the daily report. The workforce will be instructed to report any deficiencies seen in the curtain in addition to the inspection performed by the site quality control manager.

F. Removal of Turbidity Controls and Equipment

Upon completion of excavation and backfill operations, Sevenson will unlace the silt curtain for mobility purposes and place the curtain onto either floating barges or directly on the material handling pad for offsite disposal. Oil absorbent booms will be removed concurrently with turbidity curtains. The NexSens OBS 3 units will be removed via work boats or floating barges.

Temporary Sheet Pile Installation Plan

Since the current of the Delaware River may have a velocity that exceeds the 2-3 feet per second or "upper velocity threshold" that Sevenson recommends to utilize for the implementation of silt curtains, it is Sevenson's belief that installing conventional silt curtains will not adequately contain the turbidity that may be generated during dredging / sediment removal operations in the deep-water excavation area and may also impede the placement of non-woven fabric and backfill. As such, in order to control this turbidity, prevent any excursions of sediment outside of the designated work area and to aid in non-woven fabric installation, Sevenson will install a temporary sheet pile wall or turbidity wall. (See Figure 3)

Figure 3:

.

This wall, which has been designed by Glynn Geotechnical Engineers (GGE) will consist of paired AZ13 steel sheet piling (or equivalent) supported by composite king piles (composite HP 12 x 74 / paired with AZ 18 sheet piling or equivalent materials) installed at approximate 16.5 ft intervals along the wall (See Appendix A - design document titled Sheet Piling Turbidity Wall Design Calculations dated June 1, 2009 prepared by Glynn Geotechnical Engineers). These King Piles will be driven to a toe depth of up to 30 ft into the sediment, depending on the mudline elevation, while the adjacent "curtain" wall of paired sheets will be driven to a minimum depth of 6" - 12" into the sediments. This turbidity wall will also contain a light "hanging" waler system along the top of the intermediate sheet piling between the king piles to limit any deflection on these sheets. Intermittent overflow weirs protected by geotextile fabric will be installed to balance the hydrostatic pressure. Also, note that in shallower areas this sheet pile wall may be constructed utilizing normal cantilevered sheet piling as an alternate to the spaced king

piles based on the provided design criteria. It is important to note that this wall is being installed for (3) primary purposes:

1. To contain sediment within the deep excavation area;
2. Prevent backfill from being washed downstream during installation;
3. To aid in the deployment of non-woven fabric. It is not designed or intended to provide any structural support that would allow for the cell to be dewatered. (See Figure 4)

Figure 4:

A. Temporary Sheet Pile Installation Equipment

In order to install the temporary sheet pile, Sevenson intends on mobilizing the following equipment to conduct the operation:

- 200 (+) Ton Crawler Crane (Land Based);
- 100 (+) Ton Crawler Crane (Floating Crane barge);
- Two to Three Floating Work Barges (Equipment and Material Staging);
- APE 150 or 200 Vibratory Hammer with power pack;

- Hydraulic Excavator with vibratory pile driving attachment (Floating Crane barge);
- Rubber Tire Loader (Unload sheet piling);
- Man-lift (As necessary);
- Crane Mats (As necessary);
- Portable Welding Machine;
- Work Boat with USCG required safety equipment;
- Personnel Transportation Boat with USCG required safety equipment;
- Torches and Other hand tools that may be required.

As Sevenson will be required to have a crane on shore to perform the deep water dredging / sediment removal operations and a second crane on a support barge to facilitate the installation of the marine mattresses after the sheeting has been installed, it is Sevenson's intent to install the temporary steel sheet piling utilizing a combination of this same equipment.

Sevenson plans to utilize a 200 plus ton crawler crane on shore in order to obtain the reach that is required to excavate and backfill the sediment excavation area (See Sediment Excavation Plan included in this document). In addition, this crane will also aid in loading the sheeting onto the material support barge and will provide assistance with the sheet pile installation as necessary. A second floating Crane barge with a minimum of a 100 plus ton crawler crane on-board will be staged in the Delaware River to lace and drive the steel sheet piling. A hydraulic excavator with a vibratory pile driving attachment may also be utilized to assist in threading and driving steel sheet piling from a barge in the river.

Prior to installing the temporary sheeting, a survey crew will lay out the alignment of the wall. This wall will be situated approximately 5' outside the perimeter of the deep water excavation area in order to enable the environmental clam bucket that will be used on the crane to remove all of the targeted material once excavation operations commence. Once the survey layout has been completed, a work boat will be utilized to align the barge along the driving line where it will be secured with spuds and used as a guide or sheet pile template to keep the sheeting plum and square during installation activities. (See Figure 5)

Figure 5:

B. Temporary Sheet Pile Installation

Once the Survey has been completed and the alignment of the barge has been properly positioned, Sevenson will begin the installation of the temporary sheet pile. The rigging on the crawler crane will be configured to include a main line that will be used to hoist the vibratory hammer and actually drive the sheets and an auxiliary drum line (whip line) that will be used to place the king piles and sheet piles into position prior to driving. Dock builders and/or laborers will utilize tag lines to control the hammer and hoses during driving operations and ground release spring loaded shackles that will enable them to release the king piles and sheeting from the deck of the barge.

A crane will lift a pair of steel sheet piling to the work barge location or sheeting template and the sheet pile will be temporarily chained to the barge to prevent tipping. Once the sheet pile is secured to the barge the ground release shackles will be removed and the vibratory hammer will be guided into place by support crews and clamped in place. The chains would then be removed and the sheets will be driven to the appropriate grade. Sevenson will utilize a combination of the crane suspended vibratory hammer and excavator mounted vibratory attachment to thread the adjoining sheet pile. Once the sheet pile is determined to be plumb and aligned, it will then be driven to the desired

embedment depth. It is Sevenson's intent to install (3) paired AZ13 sheet piling (or equivalent) followed by (1) composite king piles (AZ18 sheets welded to a HP 12 x 74 'H'-pile or equivalent). This routine will be followed until the entire temporary sheet pile wall has been completed. Once all of the temporary sheet piling has been installed, work crews will install the "hanging" waler system across the top of the AZ 18 intermediate sheet piling from the work barge to reduce possible deflection of the sheets.

1. Additional Spill Control

Sevenson will ensure that the vibratory hammers being utilized are filled with biodegradable hydraulic oil and that the sheeting / work area is surrounded by oil absorbent booms as well as a turbidity curtain. Sevenson will also have a workboat equipped with oil absorbent pads, additional oil boom, disposal bags and USCG required safety equipment in close proximity to the work area in order to contain any spills, sheen or "rose buds" in the event that these situations arise.

The sheeting installation will commence at the Western or Downstream portion of the excavation area (Mudflat Area) and progress East or Upstream of the area. The intent is to allow the Mudflat excavation work to be completed in conjunction with the temporary sheet piling installation. Sevenson will be able to conduct these operations at the same time based on the fact that the crane will be able to load the material barge that will provide work crews enough work to stay occupied while the excavation is conducted in the mudflat areas. If the crane is unable to conduct both operations, Sevenson would mobilize a smaller crane that would be capable of loading sheets onto the material barge.

The location where the Turbidity sheet-piling is installed, adjacent to the existing installed sheet-piling wall, will have a "gap" that will be closed with sand bags which will be surrounded on the interior of the formed "cell" with a section of turbidity curtain. Since this point is located adjacent to the mudflat excavation area, and will, at time, be void of water during low tides, this "connection" will be visible and maintained on a daily basis. It is anticipated that the sheet piling installation will require approximately 3 weeks to be completed.

Sevenson will install and maintain any necessary navigation aides and markers on the installed sheeting. The USCG will be contacted prior to installation and Sevenson will

place any Coast Guard recommended navigation indicators that may consist of warning lights, warning signs, and/or marker buoys.

C. Temporary Sheet Pile Removal

After the deep excavation and backfill operations are completed, SES will begin the sheet pile removal process. The same equipment will be used to remove the sheeting as was used during the installation. Before a sheet pile is removed a cable will be attached to the bottom of the vibratory hammer and threaded through the handling holes of the sheet. The hammer will be clamped to the sheet and the extraction process will commence. As a pair of sheets is being extracted measures will be taken to prevent the re-suspension of sediments. This will include controlling the speed and amount of time that the vibrator on the hammer will be run. When the sheets breach the water during removal, there is the potential for contaminated material that is attached to the sheets to fall off of the steel and back into the water. As such, Sevenson is intending to leave a suitable width of contaminated material that has not been capped beneath the sheeting area so any material that may fall back into the water settles on like materials that have yet to be capped. Sevenson will also strategically locate the material barge to minimize the distance the sheets have to be moved during the removal process. This will prevent contamination of any areas that have been properly remediated. After a pair of sheets has been pulled and removed from the adjoining interlock, the sheets will be moved into place over the barge. The end sheets will then be rested on the barge and the jaws of the hammer will be released and the hammer lifted free of the sheets. At this point the sheets would be supported by the previously attached cable and be lowered to the deck of the barge. This will continue until all of the temporary sheet piles are removed. During the Sheet pile removal activities, Sevenson would continue to closely monitor the work area for any spills, sheen and/or “rose buds” with support crews until all of the sheet pile is completely removed from the Delaware River. Removal is anticipated to require approximately 2 weeks.

1. Decontamination

As the sheets are being removed and positioned onto the barge, Sevenson will place fabric on the barge to absorb any material that may fall off during the transportation of the sheets from the material barge to either a temporary decontamination area on

shore or the sediment dewatering pad for final decontamination. The decontamination of the sheeting will be conducted in a way to prevent any migration of potentially contaminated material offsite. If necessary, additional plastic may be deployed over any areas where potentially contaminated material may be suspended over previously remediated areas during the transportation of the sheets to the decontamination pad.

Tieback Installation Plan

Prior to the start of the tie back installation operation; Sevenson will have surveyors mark out the exact location of the holes that will need to be cut into the sheet piles to allow for the installation of the threaded tie-back rods.

Once all of the holes have been marked, a crew will be mobilized to cut the access holes for the tie backs using various cutting tools and torches. While the tie back holes are being installed, a second crew, with the assistance of an equipment operator and a laborer, will begin installing the tie backs and PVC sleeves as required.

A. Installation of Tiebacks

Due to the site layout and the location of the dead men and sheet piles that have been installed to date, Sevenson believes it would be to difficult in order to safely and efficiently install the threaded rods as single pieces since this work would have be done over the water side of the sheets and with limited access behind the sheets for the equipment that would be required to install the rods as single units. Therefore, it is Sevenson's intent to cut each of the tie backs in half prior to installing and reassemble them using the factory designed couplers. Sevenson will utilize DYWIDAG products to complete the installation. The DYWIDAG system has manufactured couplers that have been designed for this type of application.

Once in half, one piece of the tie back will be fed through the hole in the dead man and secured as shown on drawing C-30. The second half of the tie back will then be installed through the sheet pile and left loose at this time to allow for the installation of the schedule 40 PVC sleeve and the DYWIDAG manufactured coupler. Once the coupler has been secured as required by the manufacturer, and once the PVC sleeve is in place, the crew will complete the installation of the ½" fitted stiffener plates; the 2" plate; and the 1" fabricated angle on the outside of the sheets as shown in Section B-B on drawing C-

31. At this time, a seal will be installed around the annulus with high build epoxy from inside the sheets. This process will be repeated as appropriate until all of the tie backs have been installed.

Once the tie back crew has proceeded far enough ahead, a back fill crew will be mobilized to start installing backfill in lifts as required behind the sheets.

Sediment Excavation Plan

A. Site Preparation

Prior to the commencement of sediment removal and temporary sheet piling installation, it is Sevenson's intention to perform the following tasks:

- Contact PA One Call to ensure that no underground utilities are located within the excavation or sheeting foot print;
- Contact the USCG to discuss project notification form and need to obtain Private Aid to Navigation permit for the temporary sheet pile wall;
- Install (4) turbidity monitors in separate locations as directed by the regulators (see Turbidity Monitoring and Control Plan included with this document);
- Perform (7) days of turbidity monitoring utilizing the previously deployed monitors or through the use of a sample technician in order to determine background;
- Perform an initial topographic and bathymetric survey to confirm baseline sediment elevations prior to the start of work.
- Deploy turbidity curtain and oil booms around the perimeter of the Mudflat work area;
- Install temporary sheeting, silt curtains, oil booms and/or aids to mariners (floating marker buoy with flashing beacon lights, signage, etc) around the perimeter of the deep and tidal transition work area (see Temporary Sheet Pile Installation Plan included with this document);
- Install an access route from the sediment removal area which will be utilized by the tandem dump trucks that will transport the excavated sediment to the 155' x 155' drying pad / material handling pad. This road will have delineation markers consisting of traffic cones or traffic barriers that will provide for safe operation on the road to and from the material stockpiling pad.

- Construct a work pad, of which a 200+ ton crawler crane, equipped with a 2 to 4 cubic yard environmental clamshell bucket and Clam Vision GPS system, capable of X, Y, and Z controls. This pad will be constructed in such a way as to provide for a safe stable work area for the appropriately sized crane. It will be constructed with wooden mats and stone, as necessary to field fit to the crane selected;
- Mobilize multiple work boats equipped with oil booms, absorbent pads, gaff hooks, and any other equipment that may be necessary to expedite the capture and clean up of any oil sheen or "rose buds" that may be encountered as a result of this work. These vessels will also be utilized during the surveying process once the removal of sediment is completed as well as visual verification procedures.

While the site is being prepared, a State of Pennsylvania licensed land surveyor will take initial shots of all of the permanent sheeting that has been previously installed. After the initial shots have been taken, Sevenson's quality control personnel will conduct daily monitoring of the sheets to be sure that no movement has taken place. These results will be recorded in each day's daily report. If a daily inspection provides evidence of possible movement, Sevenson will notify the site engineer as well as the PA licensed land surveyor to verify the movement. It is Sevenson's intention to utilize the site quality control personnel to conduct the necessary survey checks during each operation. A PA licensed land surveyor will record the necessary shots to achieve the required as-built drawings only when Sevenson arranges for their services. All of the necessary as-builts will be provided by a PA listened land surveyor, however, their services will only be called upon when Sevenson has completed the necessary procedures. The bulk of the PA licensed land surveyor will occur during the beginning an end of the project with various verifications in between, as required.

B. Pre-Excavation Turbidity Control

Prior to excavating PCB latent sediment from the deep and tidal transition work areas, it is Sevenson's intention to first address the water conditions and turbidity controls through the use of a temporary sheet pile wall. In order to control turbidity, prevent any excursions of sediment outside of the designated work area and to aid in non-woven fabric installation, Sevenson will install a temporary sheet pile wall or turbidity wall. This wall, which has been designed by Glynn Geotechnical Engineers (GGE) will consist

of paired AZ13 steel sheet piling (or equivalent) supported by composite king piles (composite HP 12 x 74 / paired with AZ 13 sheet piling or equivalent materials) installed at approximate 16.5 ft intervals along the wall. A turbidity curtain and/or oil boom will be installed around the sheet pile work zone. These King Piles will be driven to a toe depth of up to 30 ft into the sediment, depending on the elevation of the mudline, while the adjacent "curtain" wall of paired sheets will be driven to a minimum depth of 6" to 12" into the sediments. This turbidity wall will also contain a light "hanging" waler system along the top of the intermediate sheet piling between the king piles to limit any deflection on these sheets. Intermittent overflow and / or underflow weirs will be installed in order to balance hydrostatic pressure. The intermittent overflow and / or underflow weirs will utilize the same filter fabric that will deployed under the sub-aqueous cap. Sevenson intends on driving approximately (9) pair of sheets to TOS elevation 0'. Sevenson will position three weirs along the sheetpile wall. Each weir will consist of (3) pairs of sheets. (See Appendix E). The filter fabric will be combined with oil boom to prevent the release of any sheen. (See Temporary Sheet Pile Installation Plan included with this document)

As the pre-excavation controls are being installed, Sevenson will conduct any necessary site clearing of overgrown vegetation that has returned since being removed. This will be done with conventional equipment and all the material removed will be properly disposed.

C. Mobilization of Equipment for Excavation

The 200+ ton crawler crane that was utilized for the installation of the temporary sheet piling will also be responsible for the subsequent removal of approximately 4,000 cubic yards of PCB latent material from the Delaware River Bed. The equipment that will be utilized for the sediment removal and backfill operations will consist of:

- (1) 200+ ton crawler crane, equipped with a 2-4 cubic yard Cable Arm environmental clamshell bucket and a ClamVision global positioning satellite system, capable of X, Y and Z control;
- (1) 2 –4 cubic yard conventional clamshell or digging bucket for the crawler crane, if necessary to remove dense material that would normally be problematic for the Cable Arm environmental clam shell bucket.

- (1) 60,000lbs to 80,000lbs class hydraulic excavator equipped with a long front attachment, equipped with a TopCon X63 RTK GPS unit mounted to the necessary components
- (1) 60,000lbs to 80,000lbs class hydraulic excavator to assist with the transportation of sediment from the skip boxes to the tandem dump trucks.
- (1) 40,000lbs hydraulic excavator to assist with the unloading of trucks at the sediment drying pad / material handling pad as well as to maintain the dried material stockpile inside the material handling pad.
- (1) rubber tire front-end loader equipped with a 3 to 4 cubic yard bucket to assist with the construction of the hauling road and crane pads;
- (1) rubber tire front-end loader equipped with a 2 to 3 cubic yard bucket to assist with the stockpiling of dry material on the material handling pad.
- Multiple 2" to 4" submersible and trash pumps to be placed in the material handling pad to remove decanted water from the saturated soil. This water will be pumped to the onsite waste water treatment plant. These pumps will also be utilized to decant any significant water inside the skid boxes.
- (2) 80,000GVWR tandem dump trucks with sealed tail gates;
- Multiple Skip Boxes with an approximate area of 10'x 15'x 4' and the capacity of approximately 20 cubic yards of storage.

During the installation of the sheet pile wall, Sevenson will maintain the current haul road and construct a crane pad to be utilized during the removal of sediment. The existing haul road will be maintained from the sediment loading area at the eastern or upstream end of the jobsite, where excavation will commence, and will travel to the 155' x 155' drying pad that has been previously constructed. This road will be upgraded with additional material as necessary. Spurs and turnarounds will be added to certain areas where it is necessary in order to safely maneuver the transport vehicles. These spurs and turnarounds will be constructed as the sediment removal operation proceeds west.

This hauling road will be relocated as the excavation progresses west. If possible Sevenson will remove the fabric and stone utilized from the previous haul road area and reuse the material as the progression continues westward.

D. Excavation

Once the sheet pile turbidity barrier has been installed, the monitors have been positioned, the construction of the crane pad and hauling road are complete, and all the necessary protocols stated above have been completed, Sevenson intends to commence the removal of PCB latent sediment into two separate operations that will consist of:

1. The excavation of a shallow mud flat area located on the west side of the existing permanent sheeting wall along the shoreline that is exposed at low tide.
2. A deep-water excavation that will take place after a temporary sheet pile wall has been installed around the waterside of the excavation footprint of this area to control turbidity

1. Mudflat Excavation

Prior to initiating the shallow excavation in the mud flat area, Sevenson will install an enhanced silt fence, similar to the Super Filter Fabric fencing utilized at the site, in order to prevent the migration of sediments out into the river during high tide. This will consist of steel fence posts and welded wire fabric installed around the perimeter of the excavation area at the high tide elevation. This super silt fence will be tied into the sheeting at each end and sandbagged to prevent the potential for leaks or excursions. In addition, a 4' high turbidity curtain and an oil boom will also be installed just outside this fence in order to provide additional controls for any potential turbidity and / or oil sheen that may be encountered.

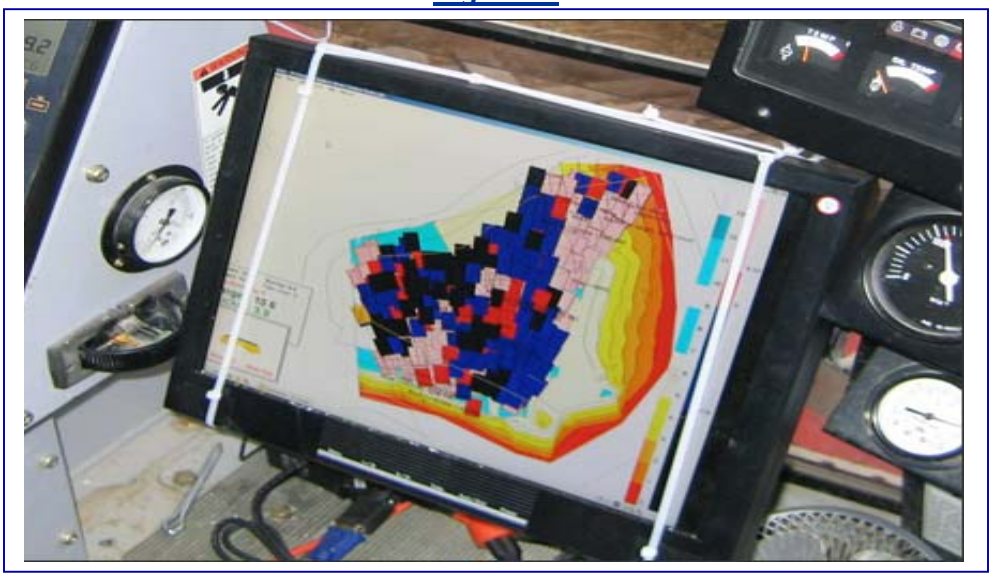
It is Sevenson's intention to utilize (1) 200+ ton crane to remove the sediment from the mud flat area with the crane located in the upland area on wooden swamp pads. Due to the performance of these operations during the low tide cycle , it is anticipated that the excavation rate will be 150 to 250 cubic yards per day; however, this rate may be altered once experience is gained during the mudflat sediment excavation. The crane will be equipped with a 2-4 cubic yard Cable Arm environmental clam bucket and ClamVision GPS technology. Sevenson will download the excavation limits that have been based on the 1999 bathymetric survey into the ClamVision software to establish control. Once the excavation limits have been installed in the unit, Sevenson will remove the required amount of

sediment from each area. The Cable Arm environmental clamshell bucket will provide Sevenson with a safe and precise removal of contaminated sediment. The utilization of the Cable Arm clamshell will minimize the resuspension of contaminates, reduce the risk of over excavation and limits the amount of water removed with each bucket. (See Figure 6)

Figure 6:

The GPS ClamVision software is a fully integrated dredge or excavation positioning system. ClamVision will give Sevenson a real time view of the crane and clamshell bucket positions as they exist at the project. The precision of the Cable Arm Clamshell and the ClamVision GPS will provide Sevenson with the proper controls to remove sediment from both the mudflat and deep excavation areas. The GPS ClamVision software utilizes RTK, real time kinematic technology, which will allow the crane operator to visually see the areas where the sediment is being removed from the monitor mounted inside the cab of the crane. (See Figure 7)

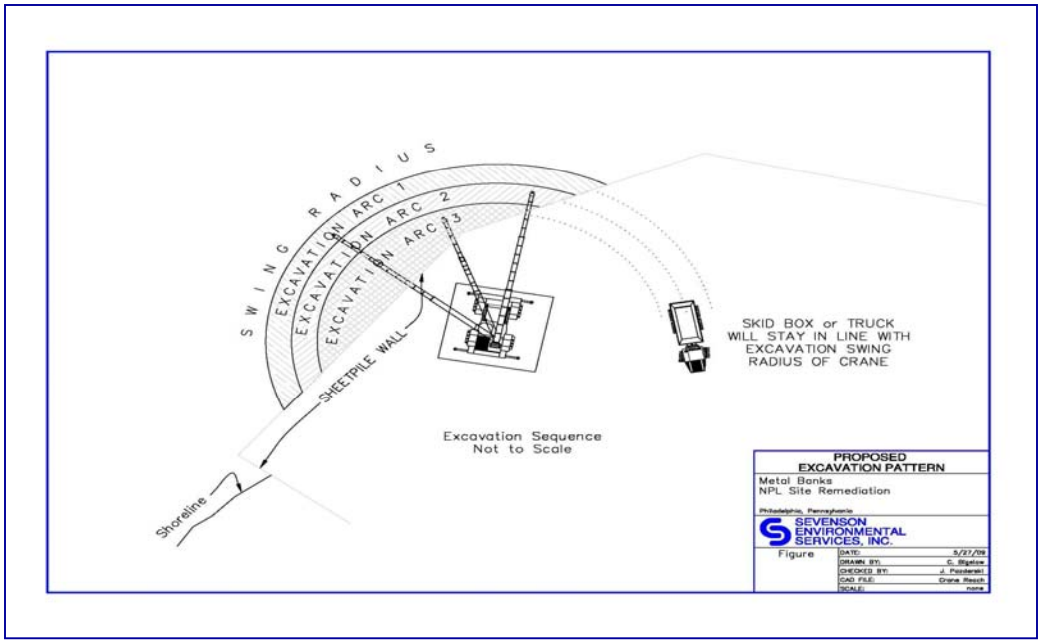
Figure 7:



The 200+ ton crawler crane will be positioned on the previously constructed crane pads that will be comprised of approximately (15) 5’ x 20’ x 1’ hard wooden mats placed on a level base. These crane pads will be a level and stable platform to allow for the crane to remove and load out sediment. The initial crane pad will be constructed on the eastern or upstream area of the jobsite and additional crane pads will be assembled as the excavation process progresses to the west.

The proposed excavation pattern will begin with the outer sediments in the mudflats at the eastern portion of the jobsite and proceed inward toward the shore once the entire outside radius has been removed. As the crane, equipped with the environmental clamshell bucket, removes the sediment from the mudflats, it will cast the material into an awaiting skid box or truck that are positioned on the upland hauling road which has been placed in the direct path of the cranes swing radius. (See Figure 8)

Figure 8:



In order to prevent spillage and cross contamination of the shoreline and permanent sheet pile wall, Sevenson will deploy 6-mil polyethylene sheeting under the swing radius and over the hauling road where the trucks and/or skid boxes will be positioned for loading. To prevent the migration of sediment during the transportation of the material from the sediment loading area to the material handling pad, Sevenson will drape a tarp over the loading side of the dump truck while the loading process is taking place. Once the trucks are loaded, the side tarp will be removed and the truck will transport the removed PCB latent sediment to the 155' x 155' drying pad where it will be released. A dump ramp will be constructed out of wooden mats and dense grade aggregate (DGA) fill at the sediment drying / material handling pad. When a loaded truck reaches the sediment drying pad a laborer will guide the truck into position and the load will be dumped. In order to control the splashing of saturated sediment outside of the material handling pad, a tarp barrier supported by posts will be used as needed and the truck will dump in a slow cautious manner. After the load has been dumped, the laborer will direct the truck forward to remove any sediment or debris that may impede the proper sealing of the tailgate. Once the tailgate has been sealed the truck will return to the sediment loading area via the hauling road.

If the operation prevents Sevenson from directly loading the tandem dump truck, 60,000lbs to 80,000lbs class excavator will be positioned to remove the material placed in the skid box and load the trucks. The same tarping measures will be utilized to prevent any migration of sediment. Sevenson would also like to reserve the use of a range of different clamshell buckets, both size and style. The purpose for the use of a 2-4 cubic yard bucket is to be sure that the cranes reach capacity will not limit the use of a clamshell. If it is discovered that the crane is unable to attain the necessary reach with the use of a 4 cubic yard bucket, Sevenson would like to utilize a smaller version. It is also a possibility that the environmental clamshell bucket may have difficulties removing more dense sediment and debris from the excavation zones. If this were to occur, Sevenson would employ a conventional clamshell bucket that has the ability to dig into dense sediment. If the conventional clamshell bucket is not effective due to the dense sediment, Sevenson may elect to utilize a hydraulic excavator equipped with a TopCon X63 RTK GPS system. Much like the ClamVision software, the TopCon X63 3-D integrates real time animation on a screen mounted inside the cab of an excavator to allow for the operator to know the exact location of where the sediment has been removed as well as the location of the bucket. The X63 utilizes multiple sensors located on the excavator to relay the excavator's movements to the base station, located on site. This provides a precise excavation and maximizes productivity.

The excavation will proceed from the riverside of the mudflats toward the shoreline, working from east to west. Once a section of excavation has been completed, a survey of the area will be performed to verify that the design criteria has been achieved. Verification surveys will be performed using conventional survey equipment in shallow or dry areas. Due to the soft sediment, Sevenson will follow the USACE guidelines with the use of a 6" disk attached to the bottom of the survey rod. In shallow water areas, Sevenson will utilize a work boat to allow the surveyor to gain access to the sediment removal area. The survey process will continue to follow the excavation as it proceeds west. Sevenson will also conduct visual verification in the field to confirm that no visible oil is present. If the initial removal of the sediment to the excavation limits has been completed and oil is still

visible, Sevenson will remove an additional two feet and perform another verification survey as well as visible inspection. If the second visual inspection once again reveals that oil is still present, Sevenson will remove an additional one foot of sediment. This area will be surveyed using the same methods and no further visual inspection will be preformed.

Sevenson will then decon the excavator buckets in a previously constructed contamination reduction zone and use this equipment to install the Mirafi 1100 NPA geotextile fabric and clean backfill prior to the tide returning. (See the Geotextile and Backfill Installation Plan) Interim silt fences will be set up between the clean and dirty areas to minimize the potential for cross contamination once an area has been completed. Again, Sevenson is assuming a production of approximately 150 to 250 cubic yards per day in this area.

It is Sevenson's intent to excavate all of the mudflat area before the area is backfilled.

2. Deep Water Excavation

To perform the deep-water excavation, it is Sevenson's intent to utilize the same 200+ ton crawler crane with an appropriately sized Cable Arm environmental clam bucket positioned a minimum of 30' inside the previously installed permanent sheeting wall in the same manner as the mud flats excavation was conducted. The crane will be equipped with a 2-4 cubic yard Cable Arm environmental clam bucket and ClamVision GPS technology. This environmental clam bucket and GPS software will allow the crane operator to visually see the movement of the bucket in real time motion on the screen located in the cab of the crane. Sevenson may elect to utilize a conventional clam bucket that has the ability to remove firm sediment that may be problematic for the environmental clam bucket. Sevenson will download the excavation limits that have been based on the 1999 bathymetric survey into the ClamVision software to establish control. Once the excavation limits have been installed in the unit, Sevenson will remove the required amount of sediment from the deep and tidal transition areas prior to the placement of the geotextile and stone backfill (See the Geotextile and Backfill Installation Plan). The deep water dredging work will commence at the points furthest from shore in the deep water areas using the crane and environmental clam bucket, and work inland toward the shallow areas,

as seen in figure 3. An arc pattern will be utilized for the excavation to ensure proper coverage. This will also allow any sediment that may have spilled out of the bucket to be re-excavated and removed as the excavation operation works back toward the shore. Upon completion of the excavation, Sevenson will complete the verification survey using USACE approved practices in order to be sure that all the required grades have been met and the removal of the material to the excavation limits have been completed.

Should the need arise, Sevenson will also have a conventional clam bucket and a barge mounted excavator available to augment excavation operations if necessary.

To control the work and ensure that Sevenson is achieving proper excavation depths and removing all of the material as required, both a crane mounted GPS and a conventional survey crew will be used to ensure that the excavation is in compliance with the design and that no contaminated sediment is being left behind.

On shore at the loading operation, Sevenson will deploy a piece of plastic/liner over the swing radius of the clam bucket in order to contain any spillage of the excavated materials while they are being loaded into temporary skip boxes or tandem dump trucks. This material will then be transferred from the skip boxes into trucks by 60,000lbs to 80,000lbs class excavator and will be transported to the sediment handling pad / drying pad in the same fashion that was utilized during the mudflat excavation. Although all of the loading work will be taking place within the exclusion zone, in an effort to keep the trucks as clean as possible, it is Sevenson's intent to drape the sides of the trucks with light tarps to keep the exterior as clean as is practical. In addition, to further control the potential migration of contamination, Sevenson will operate the dump trucks transporting material on designated haul routes within the exclusion zone that will be maintained as appropriate. At the end of the dredging and excavation operations, Sevenson will scrape up the top 2 to 3 inches of the road material and place it on the staging pad for sampling as per the specifications. If the samples come back within the site requirements, as expected, the road material will then be reincorporated into the cap with the sediment material prior to the import of cover soil. In the unlikely event the road material does not meet the site requirements; it will be shipped off site for disposal of along with sediment

possessing similar sample results. For the material that returns elevated sampling results that require offsite disposal, it will be classified and transported as per the selected disposal facility requirements. (i.e. Moisture content and waste concentration. In the event that the material deemed for offsite disposal appears to be saturated, Sevenson will perform a paint filter test as necessary. Please note that with the aforementioned provisions in place, Sevenson is not intending on performing a wet decon of the transport vehicles until the excavation operation has been completed. The area will be appropriately marked as an exclusion zone until such time as the area can be considered clean.

At the drying pad, a 40,000lbs class excavator or equivalent and a rubber tire front-end loader equipped with a 2-3 cubic yard bucket will be used to handle the incoming sediment material as required for drying and stockpiling. Additional 2”-4” submersible and trash pumps will be placed in certain areas around the material handling pad / drying pad to remove any water inside the pad in order to allow the sediment to dry out. This water will be pumped to the onsite waste water treatment plant. It is assumed that this material will need to be drained and air dried prior to becoming stackable, as each load of sediments is dumped it will be spread in a thin veneer across the pad to expose as much of the surface area as possible for drying.

Once the material has dried sufficiently, it will be stacked into appropriately sized piles in order to obtain the required 150 cubic yard volume for sampling. Once the material has been sampled and deemed useable on site, it will be combined with similar materials possessing similar sample results and staged in a stockpile adjacent to the southern perimeter of the asphalt pad. The stockpile will be covered with poly sheeting and surrounded with silt fence until the material is ready for use as subgrade material for the southern area cap.

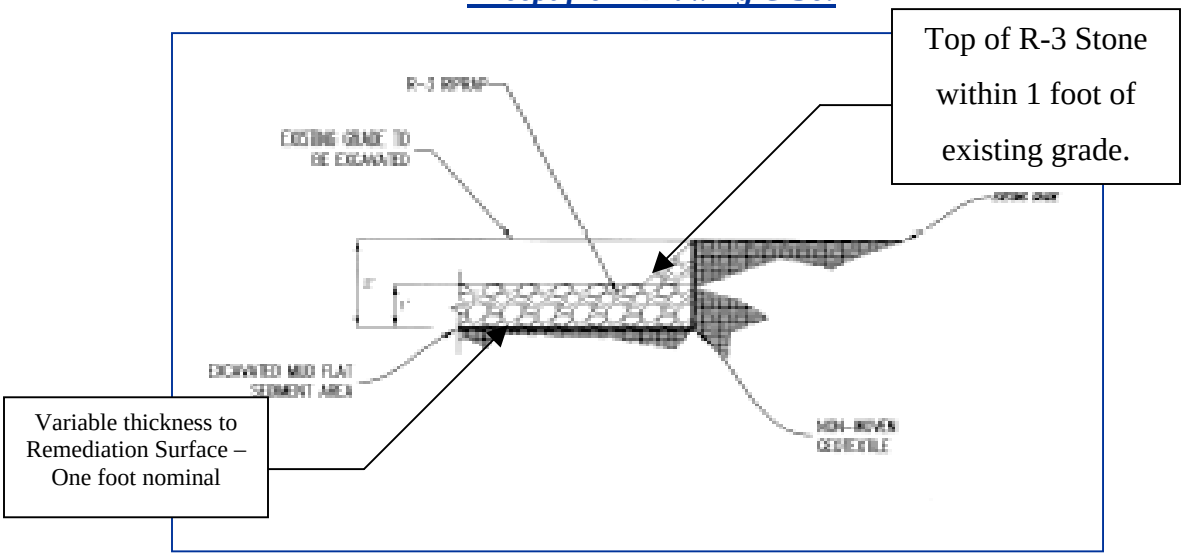
Geotextile and Backfill Installation in Sediment Removal Areas

Once all of the verification surveys have been completed and it has been determined that the sediment excavation objectives have been achieved by removing the material to the excavation limits based on the 1999 Bathymetric survey, Sevenson will initiate the deployment of the non woven geotextile fabric and minimum of 1’ of R-3 rip rap stone over the excavation areas as required in the Mud Flats and Deep Sediment Excavation Area.

A. Deployment of Geotextile in the Mudflats

The Mud Flat fabric will be installed during low tide while visibility will not be restricted. Verifying the 2' overlap on the geotextile fabric and the thickness of the stone that will be installed will not be a problem. Prior to the start of backfill installation in the mud flats, an operator on the long front excavator will be used to assist two laborers deploy the geotextile fabric as required. Once the fabric is in place with the required overlap, it is Sevenson's intent to cast the stone from shore out into the proposed backfill area with a 60,000 to 80,000 lbs class long front excavator where a second 60,000 lbs – 80,000 lbs class excavator positioned on crane mats will be utilized to spread it to the desired 12" to 36" thickness as per the sediment excavation details on Drawing C-36. In certain areas, the 200 plus ton crane with the clam shell bucket may also be used to deploy the stone when practical. (See excerpt from Drawing C-36)

Except from Drawing C-36:



B. Deployment of Geotextile and Stone in Deep / Tidal Excavation Areas

The deployment of the geotextile fabric and stone in the deep/tidal transition sediment excavation areas, Sheet Pile Zones 2 and 3, will be done through the water column. A different approach will need to be utilized for the work in this area. Since the temporary sheet pile wall will be in place during the installation of the geotextile fabric and backfill in this area, the Delaware River current and associated tidal fluctuation should not have a significant impact on the placement of these materials.

1. ***Deployment of Fabric***

   To minimize issues with the overlap on the geotextile fabric in this area, it is Sevenson's intent to divide the deep water excavation area up into three sections. (See Appendix B)Once the sections have been properly delineated, Sevenson will custom fabricate a single sheet of fabric that will be deployed over each section. To fabricate each panel, Sevenson will roll out the appropriate amount of geotextile fabric parallel to the permanent sheet pile wall and sew the seams between the panels with a commercial grade hand held sewing machine. It is Sevenson's intention to sew the fabric in an accordion manner on shore using an industrial, hand-held sewing machine, or equivalent. Once sewed, Sevenson will secure the fabric to ropes threaded through pulleys located on the opposite side of the sediment excavation area where the deployment is occurring. These ropes will then be fastened to various land based equipment located on the same side as the fabric that will simultaneously traverse and ultimately pull the fabric off of the bank and into position. In order to assure a smooth transition off of the bank, Sevenson will deploy polyethylene sheeting underneath the sewn fabric to prevent any tears or hang-ups. This polyethylene will only be used to reduce the friction of geotextile fabric as it is pulled into position. It will remain stationary on the shore line and will not be deployed into the creek with the geotextile. Once Sevenson has completed the use of the polyethylene it will be removed and placed with the oil saturated boom in a lugger box where it will be stored for characterization and future disposal as appropriate. Sevenson will utilize one signal man or call man to assure that all of the equipment is in sync. As the fabric is pulled into position, the length of the rope will increase as the machines traverse. If the there is inadequate room for the machine to maneuver, Sevenson may need to stop the operation and readjust the ropes to each machine in order to remove slack in the line. (See Figure 9)

Figure 9:

Once the material is in position, Sevenson will have a 2-man crew in a work boat will secure sand bags on one side of the fabric to sink it into position. Polypropylene rope will also be secured to the edge of the first piece and used as a visual marker to ensure the material has been placed in the proper location. A diver will also be on site as necessary to ensure that the fabric has been placed properly.

2. Installation of Approved Stone Backfill

Once it has been verified that the first side of the geotextile is in place, a land based 200+ ton crawler crane, positioned on a crane pad with a level working surface, a 2 to 4 cubic yard material handling bucket will be utilized to place the required or equally approved stone backfill along the shoreline edge to secure the fabric so the other end of the fabric can be stretched out and deployed as appropriate. The ropes used to deploy the fabric will be left in place as necessary to keep tension on the fabric and to prevent bellowing while the balance of the stone is being deployed. It is Sevenson's intent to start deploying stone in the shallow area along the shore and working out to the deeper end of the excavation area near the sheet pile wall. Please note that when using the clam shell for backfill that the stone will be placed in a controlled manner to minimize the potential for turbidity and disturbance to the previously placed non

woven fabric even though the work is being performed within the sheet pile zone and segregated from the Delaware River.

Stone backfill installation will be stopped approximately 5' to 10' from the edge of the first panel to leave room for the necessary overlap of material from the second fabric panel. Once the second geotextile panel has been fabricated and deployed utilizing the same rope and pulley procedure, the section will be verified by a diver of the appropriate overlap, the clam bucket will be used to place stone on top of the overlap and then will continue to place material on the second geotextile panel to within 5' to 10' from the end to allow for the third and final geotextile panel to be installed using the same equipment pulley procedures.

C. Verification

Once all of the geotextile and capping material has been deployed, a survey will be performed to ensure the stone has been placed to the proper elevation. If deemed necessary, a leveling device such as a steel beam, or rake will be dragged across the top of the stone to smooth it out as required for final verification.

Sub-Aqueous Cap Installation Plan

Sevenson will place the sub-aqueous cap over the areas specified in the Design Drawings that will not require sediment excavation. Turbidity monitoring will be conducted during placement of capping material to monitor for resuspension of sediments into the river. Installation work will be performed in a manner that prevents resuspension of sediments in the Delaware River and within a turbidity control zone including a turbidity curtain and oil boom.

A. Sub-Aqueous Cap Layout

Sevenson will install the sub-aqueous cap in locations marked on Design Drawings C-32 (Sediment Excavation Plan - South and Mudflat Areas), C-33 (Sediment Excavation Plan North Area) and C-34 (Sediment Excavation Sections), C-36 (Sediment Excavation & Sub-Aqueous Cap Details), and as described in Construction Specification 02900 - Sediment Excavation and Sub-Aqueous Cap. The sub-aqueous cap will be installed south of the Mudflats and Delaware River area beyond the southeastern corner of the site. [Note: The Central sub-aqueous cap area will be completed to meet the contract specifications.] The cap will be placed in the upstream area, via land-based equipment

where access is available. The remainder of the eastern cap and the cap south of the Mudflats will be deployed with a crawler crane mounted on a deck barge.

B. Sub-Aqueous Capping Mattress System Materials

Sevenson will install the Triton Marine Mattress System developed by Tensar Corporation for the sub-aqueous cap material. The marine mattresses are rock filled containers constructed of high strength geogrid material. Geogrid panels are laced together to form mattress-shaped baskets that are filled with stone similar to the construction of gabion baskets. The mattress also contains non-woven filter fabric.

The previous remediation contractor had constructed and deployed marine mattresses. Some of theses mattresses have been constructed and stored onsite. If these mattresses are inspected by a Tensar representative, Sevenson's quality control manager, and the resident engineer and are all in agreement that that the mattresses are adequate for deployment, Sevenson intends on deploying them in the sub-aqueous cap.

The typical width for a single marine mattress is approximately 5 feet, but can vary in length according to the placement plan. For this project, Sevenson will be placing the rock-filled Triton Marine Mattress System with an average thickness of 1 foot within the proposed sub-aqueous cap areas. The mattress lengths will vary depending upon the placement methods. The longest, 5 ft wide mattress will be approximately 35 feet long and weigh approximately 10 tons. To expedite production and provide better quality control in regard to the spacing between the mattresses, it is Sevenson's intent to lace up to 2 or 3 of these mattresses together for placement at one time, as done on another similar Sevenson project involving marine mattress placement. (See Figure 10)

As per the manufacturer, the high-strength geogrid has sufficient strength to permit rock-filled mattresses up to 35 feet in length to be hoisted from one end for placement. However, during the installation for the majority of the lifts, it is Sevenson's intent to utilize a spreader bar and bridle system that will pick the mattresses up by both ends prior to lowering the units into place. Once they are in place, either divers and /or a quick release shackle will be utilized to separate the mattress from the lifting device.

Figure 10:

The use of the Triton Marine System has several advantages to the conventional capping methods.

- The marine mattresses can be constructed either on-site or offsite and since the marine mattresses can be easily lifted and moved, the units can then be loaded and delivered to the site ready for deployment;
- The technique of on-land mattress construction and the ability to view the entire mattress after completion helps assure high quality mattresses prior to deployment;
- Because the marine mattresses require rock fill of relatively small size, the project site will have a local source of fill material;
- Being able to place the mattresses rapidly has an advantage when working in open tidal environments;
- Achieving the correct layer thickness in deeper water. The marine mattresses help alleviate difficulties in underwater placement because they are large units with uniform thickness that can be butted up to one another. An additional benefit of mattresses placed underwater is that the stone is not lost during installation because it is secured inside the geogrid system.

- The high-strength geogrid containers create large monolithic units that remain stable under wave and current conditions that may destroy unconfined structures built with substantially larger stone. Increasing the stone size within the mattress does not increase the overall mattress stability.
- Well-constructed marine mattresses have consistent dimensions so they can be placed in patterns without large gaps between mattresses. This insures uniform coverage for applications such as a sub-aqueous cap.
- Marine mattresses will have uniform porosity and consistent dissipation characteristics if they are filled with similar sized stone and are compacted in a similar fashion to provide the same void ratio.
- The geogrid containment structure is strong and the completed mattresses are flexible enough that they conform to usual topography and bathymetry changes.

The material used in fabricating the marine mattresses consists of geogrid, mechanical connectors, braided lacing and stone filled. Sevenson may elect to construct the mattresses onsite in a designated area that will provide an adequate area as to not become contaminated from any residual material inside the exclusion zone. This area will consist of geotextile fabric, a thin layer of stone and will provide a clean working area for the construction of the mattresses. If it is more cost effective Sevenson may construct the mattresses offsite and transport them when needed.

C. Structural Geogrid

The geogrid is made of high-density polyethylene (HDPE) and polypropylene and is manufactured so there is complete continuity of all properties throughout the structure. The geogrid material is stabilized against ultraviolet radiation deterioration. Two types of geogrid are used in the construction of a mattress containment structure. The stronger Type 2 uniaxial geogrid has a breaking tensile of 6,908 lb/ft, and is used for the exterior sides of the mattress and the lifting loops. The Type 1 biaxial geogrid has a breaking tensile strength of 3,330 lb/ft and it is used for the interior compartment dividers.

The Triton Marine Mattress System to be used on this project will include a Mirafi 1100N geo-composite attached to the bottom of the mattress system. The geogrid and Mirafi 1100N material will extend 2-feet beyond the sidewalls of the mattress.

D. Mechanical Connectors and Braided Lacing

Mechanical connectors used in mattress construction will be made of high-density polyethylene and will be installed per the details found on Drawing C-36.These connectors resemble long rods having a nominal diameter of 3/8 inch. Metal connectors will not be used on this project. Braided lacing used for tying and lacing the geogrid panels into a mattress with interior compartments will be fabricated of HDPE eight-strand braid having a nominal diameter not less than 3/16-inch and a breaking strength not less than 400 lb. Braid lacing resembles tow ropes, but with ultraviolet stabilization.

1. Stone Fill

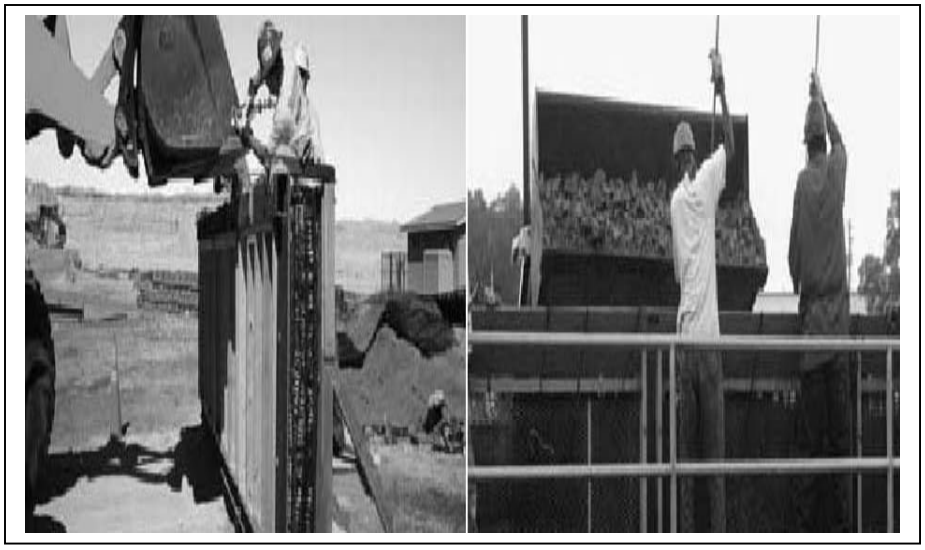
Stone used to fill the mattress compartments will be durable, free of cracks and other defects, and have a specific gravity of at least 2.5. The required average stone diameter for a 12-inch thick mattress will be 3-inches (maximum will be 6 inches). The rock will come from a PENNDOT approved Type A aggregate in accordance with Construction Specification 02900. The source of the rock will be provided to the Engineer, who will have the opportunity to inspect and approve the source. The stone will be purchased from a commercial quarry and will be certified to comply with PENNDOT specifications. {Note: It is Sevenson's intent to use the currently approved Eureka Quarry material located in Warrington Township (PA) provided commercial terms can be negotiated.] The rock will meet the requirements of PENNDOT Standard Specifications Publication 408/2007, Section 850-Rock Lining, Size R-3.

Prior to the start of mattress fabrication operations which may be conducted on-the Metal Bank Site, Sevenson will fabricate at least two custom made loading frames that will hold the mattresses in place while the aggregate is being added and the lacing is being installed. (See Figure 11) Sevenson will use a front-end loader to place the stone in the mattress compartments. Once the stone is installed in the baskets, steel rods will be used to pack it into place for a tight fit as recommended by the manufacturer. Compacted stone fill will exhibit the following characteristics:

a) Tightly confined stones that will be immobile within the mattress;
b) Tensioned interior diaphragms;
c) Snug mechanical connections and seams;
d) Slight bulging of compartments;

e) No evidence of air space between compartments during lifting. Sevenson's QA/QC Officer will perform routine inspections during mat construction to ensure the mattresses are assembled in accordance with the manufacturer's instructions.

Figure 11:



Lifting loops are constructed on both ends of the mattress by joining the upper and lower geogrid layers. Mechanical connectors will be used to secure the lifting loops to the mattress, a lifting pipe and harness is fitted to the lifting loops and the complete unit is moved by crane to the staging area or out onto the material barge in preparation for placement.

E. Water Survey

A bathymetric survey of the work areas, utilizing USACOE approved methods, will be performed prior to the initiation of the sub-aqueous cap construction in the Delaware River. When survey work is required to be performed from the water, the boat that is being utilized will be equipped with all of the safety apparatus required by the U.S. Coast Guard. All personnel on board the vessel will be required to wear personal flotation devices (PFDs). Hand held radios will be utilized to facilitate communication between the land based and water crews.

Sevenson's subcontractor will stake the outer perimeter of the proposed sub-aqueous cap locations in 50-foot intervals using plastic pipes or buoys and at each turn. Once the areas

are delineated, Sevenson will survey the bottom to determine if any boulders or obstructions are within the proposed sub-aqueous cap areas. Any obstructions encountered will be noted and marked for removal prior to the installation of the mattresses. As a means of quality control, the results of the survey will be provided to the Engineer for review prior to the start of placement operations.

F. Preparation for Sub-Aqueous Cap Installation

The marine mattress installation will require some site preparation prior to deploying the mattress units. This work will include performing utility locates; the installation of a docking /loading area east of the permanent sheeting installation; the placement of turbidity monitors as required; the installation of silt curtain/oil boom around the work area (as detailed in the attached turbidity control plan); and the removal of obstructions that were noted in the initial survey.

Prior to the initiation of any operations that may cause oil sheen to be released from the sediments, Sevenson will have a john boat in place equipped with absorbent oil booms, absorbent pads, gaff hooks, and any other equipment deemed necessary to expedite the capture and clean up of any oil sheen or “rose buds” that most likely will be encountered as a result of our work.

The temporary docking/loading area will be constructed to allow for safe ingress and egress of both manpower and equipment between the shore and the work vessels. The dock itself will consist of a small deck barge spudded against the shore with gangways / walkways constructed in between. The shoreline will be improved as necessary to facilitate use of the docking area, as well as for allowing for safe and efficient use by all parties of concern.

To remove obstructions, depending on their location, Sevenson will utilize either land based or barge mounted equipment along with the assistance of divers as necessary. Once the obstruction has been removed from the water, it will be transported to the asphalt staging pad for temporary storage until the appropriate means of disposal can be determined.

G. Placement of Mattress Capping System

Once site preparation has been completed Sevenson will begin placing the Triton Marine Mattress System. Mattress units will be placed in position at the proper elevations and in

proper alignment and pattern as designed by the engineer. Sevenson may vary the lengths of the mattresses to simplify the installation and management of the mattresses.

The Triton Marine Mattress System will be constructed onsite near the shoreline where they can be easily loaded onto a material barge for future placement activities. Mattresses will be placed on the material barge with similar sizes stacked together. Each mattress will be clearly marked with the length so it will be visible to the crane operator. Once the material barge is loaded with enough mattresses for the day, this barge will be moved adjacent to the barge-mounted crane where the operator can then begin deploying the mattresses.

Mattress units up to 35-feet in length can be lifted from both ends using a bridal /spreader bar assembly or from one end depending upon the location that the mattress is to be placed. Sevenson will determine which method is most suitable based upon the site conditions, however, as noted, it is Sevenson's desire and intent to lift and place the mattresses from a horizontal position in as many locations as possible. Units will be lifted from the horizontal position in a manner that minimizes severe bending or distortion of the top and bottom geogrids. Sevenson's goal is to maintain a fairly uniform tensioning of the geogrid across the width of the mattress. As noted earlier, it is Sevenson's intent to fabricate a lifting bracket that will enable two or three mattresses to be installed simultaneously with each cycle of the crane.

Units will be maneuvered into position using tag lines as personnel will be instructed to stay clear of the area beneath the units and support riggings at all time during a lift. (See Figure 12) After the initial deployment, a diver will be utilized as necessary to aid in the final positioning and placement of the units to ensure the maximum 4-inch spacing between the mattresses has not been exceeded. It will not be necessary to connect adjacent mattresses once in place. Since the mattresses will have pre-attached geotextile filter fabric, care will be taken to assure proper overlap of the fabric as the mattress is placed.

Figure 12:

The marine mattresses will be placed in a continuous manner (approximately 2 to 4 inches apart). In the event that spacing in any location is greater than 4 inches, stone wrapped in geotextile fabric will be placed between the marine mattresses in order to fill in the gaps. To make the repair, divers would be used to secure fabric over the area in question. A crane with a clamshell bucket or backhoe would then be used to fill the void with stone. Once full, the excess fabric would be folded back over the top of the newly placed stone to complete the repair.

H. Proposed Sequence of Operations

To summarize the proposed sequence of operations, Sevenson will:

1. Mattresses (mats) would be delivered to the site in a partially prefabricated state by the vendor;

2. The mats would be assembled by Sevenson on site per the manufacture's direction and then placed vertically, on their side, in a form for filling;

3. After completing the filling and tying operation, the mat would be laid flat, laced to one or possibly two additional mattress sections, and rigged with a lifting frame and cables in preparation for loading onto the material barges for the water based installation. If land based deployment is possible, the mats would be stockpiled

as single units and transported over to the deployment area in trucks prior to being laced together for deployment;

A sample mat will be constructed and set aside for reference through out the project;

4. Upon commencement of field operations, the mats would be loaded on to a material barge using a lifting frame and crane. For land-based operations, single mats would be loaded onto a flat deck and transported over to the work area for off loading.

5. For the water based installation, once loaded, a push boat will be used to move the material barge into position adjacent to the crane barge that will be used to deploy the mats. It is assumed that two material barges will be used so while one barge is being off loaded during placement operations, a second barge is being loaded with more mats from on shore.

6. Sevenson will start deploying the mats from the eastern perimeter of each of the remaining sub aqueous capping areas working from the deep-water elevations toward the shallows. Sevenson is utilizing this approach so the mats that are placed first will settle in and act as an anchor to hold the subsequent mats in place. To track of the location of the previously placed mattresses, buoys or stakes will be attached to the leading edge so the crane operator and deployment crew will have a visual guide to assist with the placement of subsequent mats;

7. A 100+ ton crawler crane will be used along with a lifting frame from the material barge and or shore, to pick and place the mattresses into position. The crane operator will be assisted by laborers using tag lines to control and place the mat into its approximate location. A diver will then be used to coordinate the location of the mat for placement into its final position. The diver will also be used to verify that the spacing between the mattresses does not exceed the 4” maximum.

8. The crane barge will be periodically moved with a boat or by adjusting spuds as necessary in order to position itself for the next series of mats within the safe working limits of the crane.

9. This process will continue until the areas are completed. Each area will be surveyed to assure correct coverage and to document the area as required for a final as built.

10. Once the mattress installations have been completed, Sevenson will install the 2' thick x 8' wide marine buttresses as shown on Drawing #36 (Sediment Excavation and Sub Aqueous Cap Details).

Cover System Installation

A. Erosion and Sediment Control

Prior to the commencement of the Cover System installation, Sevenson will do an additional inspection of the perimeter erosion and sediment control measures installed during the initial stages of construction to ensure they are functional and in good repair, and also to ensure that they will address any potential erosion and sediment control requirements specific to this phase of work.

B. Installation of Cover System

Courtyard Area

Sevenson will use bulldozers to ensure that the required slope has been achieved on the subgrade, installed by the previous contractor and approved by the engineer, prior to the import of soil for the 1' thick cover system meeting the requirements set forth in Construction Specification 02210. The material that will be utilized for the cover soils will be from a local borrow source (and amended as appropriate) and will adhere to the contract specifications. The cap will be constructed from the north to the south and there are no issues related to cross contamination since the geotextile and subgrade have already been installed. The imported cover soils will be directly placed using the dump truck and uniformly spread using a bulldozer in a single 1' lift and compacted. Cover soil material must meet the requirements of Pennsylvania Code Title 24, Waste Management Regulations. In addition, USEPA has provided

additional cover soil requirements. Sevenson may utilize the services of a spotter to assist each truck as it backs into position to be dumped. If it is deemed unnecessary, Sevenson will not use a truck spotter. If necessary, Sevenson will stockpile cover soil material onsite and transport it using a rubber tire front-end loader to be dumped where needed.

Southern Area

Immediately following the placement of approved sediment from the mud flat and deep water excavation areas, Sevenson will use bulldozers to ensure that the required 1% slope has been achieved on the subgrade prior to the import of soil for the 2' thick cover system meeting the requirements set forth in Construction Specification 02210. Once the subgrade has been approved and accepted by the engineer, Sevenson will then initiate the import and placement of clean fill material in lifts as required. The material that will be utilized for the cover soils will be from a local borrow source (and amended as appropriate) and will adhere to the contract specifications. The cap will be constructed from the northwest to the southeast so as to prevent cross contamination of the clean cover soil. It is Sevenson's intent to direct trucks carrying clean imported fill over previously compacted clean fill to their desired dump locations in order to mitigate cross contamination. Sevenson will also maintain the scrubber pad at site entrance to limit tracking of material onto the local roadways. If it is deemed that truck has been in contact with potentially contaminated material, Sevenson will dry decontaminate the truck on the constructed decon pad or a temporary constructed decon pad. It is Sevenson's experience that a wet decon will create additional tracking and migration of unwanted material. Geotextile meeting the requirements set forth in Construction Specification 02273 will be unrolled in the same direction immediately in front of the face of the cover soil fill. The fill material will be dumped onto the previously spread fill and spread out over the geotextile. Cover soil material must meet the requirements of Pennsylvania Code Title 24, Waste Management Regulations. In addition, USEPA has provided additional cover soil requirements. The relevant sampling and analytical requirements have been incorporated into the Construction Specifications. Analytical requirements are specified in the USEPA clean soil/sediment requirements provided by USEPA's

Biological Technical Assistance Group (BTAG) and found in the Remedial Design. As the fill placement advances, the geotextile will be unrolled and the seam sealed until the fill advances to the opposite side of the site, soil will be placed in 12-inch lifts and compacted to 95% of the maximum dry density as determined by the Standard Proctor Compaction Test. Since this area will be re-vegetated, the final lift of cover soil will not be compacted. The site will be dressed using a bulldozer and road grader to ensure proper drainage. The approved cover soil will be delivered to the jobsite in the supplier's trucks. Each truck will dump the approved cover soil in place where a bulldozer will be used to spread the soils. Sevenson may utilize the services of a spotter to assist each truck as it backs into position to be dumped. If it is deemed unnecessary, Sevenson will not use a truck spotter. If necessary, Sevenson will stockpile cover soil material onsite and transport it using a rubber tire front-end loader to be dumped where needed.

C. Compaction

The material will be spread in 12-inch lifts using the bulldozer and compacted to 95% of the maximum dry density as determined by the Standard Proctor Compaction Test. The final 6-inch lift in the two-foot cap will consist of approved compost from a local borrow source. It will be deployed in the same manner as the previous backfill and tilled in using a tiller pulled behind a tractor or bulldozer. Each lift will be compacted as the bulldozer spreads the material. The bulldozer will make three passes over placed backfill to ensure adequate compaction. Compaction testing will performed on a 50-ft grid pattern with one test per lift or as approved by the engineer as per specification section 02210.

D. Deployment of Seeding

After the backfill and compost has been tilled together, Sevenson will begin the deployment seed. The seed mix meeting the requirements set forth in Construction Specification 02910 will be deployed using a hydro-seeder. The restoration area will be evenly covered with the hydro-seed.

LNAPL Collection Trench Installation Plan

Prior to initiating the excavation for the LNAPL Collection trench installation, Sevenson will have the alignment of the trench and the location of the sumps staked out by a survey crew.

Based on the anticipated project sequencing, the southern area will be at a sub-grade elevation and the entire sheet pile wall and support system will be installed (tieback, deadmen, and compacted structural fill to sub grade elevation). Sevenson will also contact PA One Call to ensure there are no underground utilities that will be encountered within the footprint of the excavation.

A. Installation of the LNAPL Collection Trench

Once a survey crew has properly laid out the trench between the SA4/5 remediation area and the sheet pile wall deadmen support structures per the revised AMEC design, Sevenson will utilize a hydraulic excavator to begin the removal of material. It is Sevenson's intent to implement the use of trench boxes since the trench is to be constructed through unstable, non-homogenous debris to depths of up to 15' below existing ground. In the areas of the trench where the excavation will extend to approximately 15', two 8' high trench boxes will be stacked on top of one another to allow for the safe excavation and installation of both the stone collection trench and the perforated 24" HDPE sumps. In the areas of the trench where shallow excavation occurs, Sevenson will only require the use of one 8' trench box.

1. Sampling of the Removed Trench Spoils

During the installation of the trench, the excavated spoils will be placed on plastic sheeting in a windrow at a safe distance from the trench as a portion of this material will be placed back in the trench after the installation of the LNAPL trench has been completed.

Any residual spoils that cannot be utilized as backfill in the trench will be placed on the temporary stockpile pad for sampling. It will be sampled as per the specifications and if the results come back below the 25 ppm total PCB action level, the trench spoils will then be reincorporated into the sub grade below the final cover system. If the sample results returned are above the 25 ppm total PCB action level, the material will be shipped off site to a licensed disposal facility as appropriate.

Sevenson is anticipating a significant amount of water to be encountered toward the bottom of the trench excavation due to the proximity of the river and type of material that we will be excavating through. In order to avoid the need to manage and treat this water, it is Sevenson's intent to perform this work "in the wet" and to install the 4' thick

drainage stone layer through the 2' of standing water that is anticipated at the bottom of the trench. At the start of this installation, Sevenson will remove the overburden within the trench box down to the ground water level across the entire interior of the box. Once the overburden above the ground water table has been removed, Sevenson will continue to excavate the additional 2' of material from below the ground water table to achieve the final design elevation of the bottom of the trench.

The material that is removed during the construction of the LNAPL collection trench that is below the water table will be sent off site after it is determined to be TSCA or Non-TSCA depending on the sample results. A small area inside the LNAPL collection trench located at E-5 was required in the specifications to be sampled separately. Sevenson proposes to handle this material as the rest of the LNAPL material under the water table and send it to an approved disposal facility.

During the installation, if a large of amount of pure product is visible in the trench, Sevenson will take an active approach to contain and absorb the material during the trench construction. This pure product will be captured using oil absorbent boom and absorbent pads. Once the absorbent pads and boom are saturated with pure product, Sevenson will properly dispose of the material in the lugger box.

Once the design elevation has been achieved and verified via survey, laborers will use ropes and poles, as needed, in order to place and deploy the geotextile across the bottom of trench and up the sides of the trench walls. Once this fabric is in place, the backhoe will place stone on to the fabric in order to weigh it down under the 2' of water. Once the fabric has been submerged, the excavator will continue to build the stone up to the final 4-foot thickness as shown on the Contract Drawings. When the stone has been installed to the required elevation and verified via survey, the geotextile will be folded over the top of the stone in a "burrito" like fashion.

Once the fabric is in place, the overburden that was removed, sampled and approved for backfill from the initial trench excavation will be placed back in the trench in lifts and compacted with the back side of the excavator bucket.

B. Installation of the HDPE Sumps

To install the 24" HDPE sumps, the excavation will be progressed an additional foot below the water table for approximately 10' on either side of the pipe to create a sump. Once this

elevation has been reached and the sub grade has been achieved, fabric will once again be placed across the bottom and up the sides of the trench box before 6" of stone is placed on top of it. When the stone elevation has been verified via survey, a perforated 24" HDPE pipe wrapped in non-woven fabric will be lowered into the trench. The imported washed stone will then be installed to a 5' thickness in this area and wrapped in fabric. Excavation spoils will then be used to bring the balance of the excavation up to the sub grade required for the installation of the concrete vault, the 4" HDPE conveyance lines and the conduit. It is Sevenson's intent to initially complete the deep excavation work and then, when this has been completed, install the five concrete structures, all of the conduit, and the HDPE conveyance lines.

C. Schedule of LNAPL Collection Trench Installation

Due to the logistical issues of working around the trench during the land based excavation operations, it is Sevenson's intent to install the LNAPL collection trench once the deep water excavation had been completed and not in conjunction with the installation of the tie backs as noted in the AMEC document dated March 20, 2009.

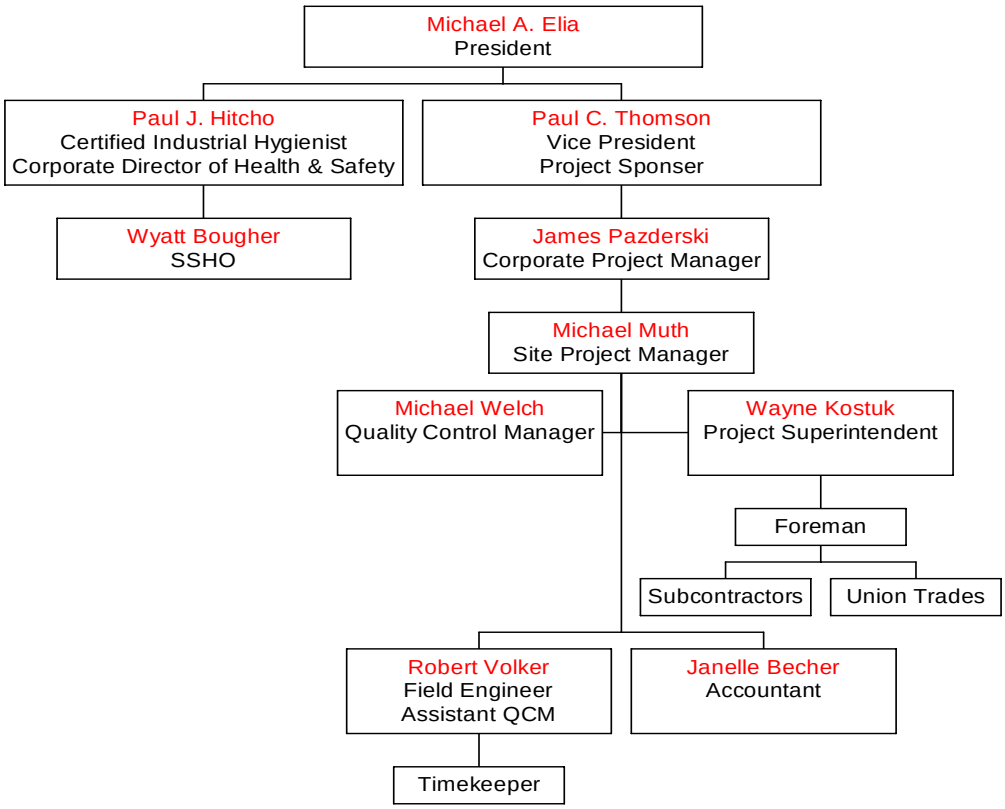
Upon completion of the LNAPL collection trench, Sevenson and all the necessary site representatives will conduct a visual inspection of the HDPE sumps to determine if there is any LNAPL that is needed to be removed. Based on the inspection Sevenson will remove product with oil absorbent booms or pads and properly dispose of the oil saturated material.

Contractor Quality Assurance/Control Plan

The currently approved Contractor Quality Assurance and Quality Control Plan that was developed by TetraTech EC (RAWP April 4, 2008) and approved by the EPA is being adopted by SES with the following modifications to the organization chart and associated forms contained in Appendix F.

- Contractor QC Report
- Initial Inspection Checklist
- Preparatory Inspection Checklist

ORGANIZATIONAL CHART



Sevenson's managers and personnel assigned to this project possess a broad range of remedial action experience and skills. All are trained, medically certified, and have been involved with the handling of contaminated wastes at Hazardous, Toxic, and Radioactive Waste (HTRW) sites throughout the country. In addition, they are familiar and fully qualified to address all the requirements of day-to-day work under this contract. The resumes of key personnel, along with their job titles, can be found in Appendix G.

The functional responsibilities of key technical personnel are summarized below.

Home Office Personnel

Paul C. Thomson - Vice-President

Mr. Thomson will ultimately be responsible for the project's success. He will provide the required Sevenson resources to ensure that the Metal Bank Project is successfully executed. He will be kept informed of the project's progress and ensure that the project is meeting its goals.

Mr. Thomson will resolve problems that cannot be resolved by the On-site Project Manager. He will periodically visit the site and become acquainted with field personnel and procedures.

Paul Hitcho, Ph.D., Certified Industrial Hygienist (CIH) - Corporate Director of Health and Safety

Regarding safety and occupational health, Dr. Paul Hitcho will:

- Maintain overall responsibility for the Metal Bank Project site safety;
- Be responsible for assigning Site Safety and Health Officer (SSHO) responsibilities;
- Ensure that all activities are carried out in compliance with the approved site Safety and Health Plan.

An AIBH-certified Industrial Hygienist, Dr. Paul Hitcho, PhD, CIH, manages Sevenson's corporate safety program in-house. Dr. Hitcho is responsible for the preparation, implementation, and enforcement of the site-specific Health and Safety Plan (HASP).

Sevenson's SSHO will report site safety activities to Dr. Hitcho on a regular basis, including all safety and occupational health issues. All job safety records generated will be thoroughly reviewed by Dr. Hitcho, who will also perform quarterly job-site safety inspections. He will prepare an audit report of findings for each inspection, including identification of deficiencies requiring corrective action.

Dr. Hitcho will supervise the SSHO, review the respirator qualitative fit tests, and develop the air-monitoring program. He will make periodic trips to the site to conduct safety audits, observe the administration of this plan, and make any necessary modifications to the program.

James Pazderski,-Corporate Project Manager

Mr. Pazderski will oversee the project at the corporate level and report directly to the Vice President. He will communicate with the On-site Project Manager regarding all aspects of the project including, but not limited to, project problems, progress payments, schedules, administrative duties, and QCM oversight.

Kenneth Paisley, CHMM - Regulatory Specialist

Mr. Paisley is responsible for regulatory compliance on all Sevenson projects. He is committed specifically to overseeing all field sampling and chemical data acquisition plans, and is the point

of contact with off-site laboratories. Mr. Paisley will review laboratory reports with Sevenson's selected lab to ensure compliance with project specifications and all required protocols. He will coordinate off-site waste removal, including transport, disposal, manifesting, waste profiles, regulatory compliance, and disposal requirements.

Field Personnel

Michael W. Muth- On-site Project Manager

Mr. Muth, Sevenson's On-site Project Manager, will be the contact person with whom Malcolm Pirnie will communicate with on a daily basis under this contract. Mr. Muth will ensure that:

- Appropriate Sevenson and subcontractor resources are allocated to the project and balanced to ensure best value to the Cottman Avenue PRP Group and the project team.
- All tasks are conducted in accordance with the site HASP and project specifications.

Sevenson field personnel may rely on home office support throughout the course of the project. Mr. Muth reports directly to Sevenson's VP, Paul Thomson and Corporate Project Manager, James Pazderski. When problems arise that cannot easily be rectified in the field, Mr. Muth and Mr. Thomson / Mr. Pazderski will become and remain personally involved until each problem is resolved and appropriate corrective measures are implemented. Mr. Muth will normally communicate with Mr. Thomson and Mr. Pazderski at least once daily on the progress of the project.

As the On-site Project Manager, Mr. Muth will also aid in the implementation and support of Sevenson's Contractor Quality Control Plan (CQCP) at the Metal Bank Project. He and the Quality Control Manager (QCM) will have both the authority and the duty to halt any operation appearing to be out of compliance with contract specifications. Mr. Muth has the control and responsibility to schedule all phases of construction to ensure that the project progresses on schedule. He will oversee all aspects of work under this contract for remediation at the Metal Bank Project, including:

- All procurements and scheduling
- Mobilization / Site preparation

- Erosion and Sediment Controls
- Tieback Installation
- Temporary Sheet Pile Wall Installation
- Excavation/Sediment Removal
- Material load out/Offsite disposal (as necessary)
- Construction Water Treatment
- Subaqueous Cap Installation
- Cover System Installation / Backfill
- Restoration
- Demobilization
- Contractor coordination
- Acting as site liaison between Sevenson and Malcolm Pirnie
- Maintaining charge of all field operations

Wayne Kostuk – Project superintendent

Mr. Kostuk will be responsible for supervising all field activities on the Metal Bank Project. His duties include supervision of Sevenson's craft labor (equipment operators, truck drivers, and laborers), technical staff (survey crew), and all subcontractors.

Mr. Kostuk will assist in planning the daily work activities in association with the Projected Construction Schedule, in order to help ensure that the project remains on schedule and within the budget proposal. He will also ensure that the QCM is kept fully informed of the work scheduled to be performed at least one week in advance, in order that all QC functions and notifications can be kept current. This will be accomplished by daily planning meetings between the Project Manager, Superintendent and QCM during which the Superintendent will outline his plans for the next day's activities. This will also help ensure that the project remains on budget, as well as on time.

Wyatt Bougher - Site Safety and Health Officer (SSHO)

As Site Safety and Health Officer, Mr. Bougher will report to Sevenson's Certified Industrial Hygienist and be responsible for the implementation of the approved site HASP; including conducting required safety inspections, safety briefings, and reports of safety-related activities. Mr. Bougher will also report to the On-site Project Manager daily regarding on-site health and safety concerns and corrective actions. SSHO has received 40-hour HAZWOPER training per 29 CFR 1910.120(e), and possesses current Red Cross First Aid and CPR training. Mr. Bougher's responsibilities will also include the following:

- Scheduling and documenting that all contractor and subcontractor personnel working on site have proper safety training and medical surveillance.
- Verifying that all personnel working on site are aware of potential hazards and task appropriate personal protective equipment.
- Safety inspections and monitoring performance of personnel for compliance with the HASP and correction of deficiencies.
- Reviewing air monitoring data and recommending changes to PPE, work practices or engineering controls.
- Daily review of safety operations and completion of a daily record of activities
- Investigation, reporting and management of all accidents or incidents occurring at the site.
- Reporting any unsafe acts or conditions and verification of corrective actions taken.

Mr. Bougher will have both the authority and the duty to halt any operation appearing to be out of compliance with the HASP or is deemed unsafe. Operation will remain shut down until corrective action can be made and verified by SSHO.

Michael Welch –Quality Control Manager (QCM)

Michael Welch will perform the duties of the Quality Control Manager.

As Quality Control Manager, Mr. Welch will report directly to the On-site Project Manager with matters concerning quality control. He will have both the authority and the duty to halt any operation appearing to be out of compliance with contract specifications.

Mr. Welch is responsible for keeping and maintaining all records related to personnel, supplies, equipment use, equipment calibration and sampling. His functions will be as defined within the contract specifications and as referenced in the Quality Control Documents.

QCM responsibilities include:

- Performing and documenting field inspections.
- Preparing daily Quality Control Reports.
- Scheduling, reviewing, certifying, and managing project submittals.
- Maintaining the Submittal Register.
- Providing coordination of required quality control testing, reviewing results, and submitting.
- Tracking construction deficiencies and ensuring timely corrective action.
- Coordinating field-sampling activities (as required).
- Reviewing calibration of test equipment (as necessary).
- Coordinating responses to vendors' requests for information and technical issues.
- Delegating duties to alternate QCMs and notifying the Project Manager to what duties have been delegated.

Mr. Welch may have an assistant who will aid him in the performance of the Quality Control duties and responsibilities.

The QCM or his designated alternate must be on-site when work is being performed.

Robert Volker –Field Engineer / Quality Control

Mr. Volker's duties will be to aid the Project Manager in procuring all the required information needed, as well as coordinate materials that are to be delivered and removed from the Project.

Mr. Volker will assist in the Quality Control duties and in some instances act as QCM. He will provide site support to both the Project Manager and the Quality Control Manager. He will be delegated to perform some of the duties of the Quality Control Manager.

Janelle Becher-Accountant

Ms. Becher will perform all accounting duties on site as well assist in time tracking, cost tracking and material / equipment procurement. She will report directly to the Project Manager to help ensure that the project remains on budget.

Labor Force

Workers on the project will have documentation of training and experience, 40-hour HAZWOPER training certification and 8-hour refresher training, and documentation of passing a physical. In addition to these certifications, each employee will receive a site-specific health and safety orientation given by the Sevenson SSHO on site.

Sevenson intends to perform this project with union labor from the local area.

Key Sevenson employees, such as foremen, lead operators, etc. will be from Sevenson's main offices, and will be integrated into the work force.

Appendix A:

Sheet Pile Turbidity Wall Design Calculations

Civil • Structural • Geotechnical • Materials Testing • Consulting

Sheet Piling Turbidity Wall Design Calculations

Metal Bank NPL Site,

Philadelphia, Pennsylvania

prepared for:
Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

prepared by:
Glynn Geotechnical Engineering
415 South Transit Street
Lockport, New York 14094

GGE 09-1077

June 1, 2009

Cantilevered Sheet Piling / King Pile Supported Turbidity Wall Design

This submittal provides a design for a steel sheet piling turbidity wall for the land-based sediment excavation within the Delaware River at the Metal Bank NPL Site in Philadelphia, PA. This design uses steel sheet piling toed into the sediments at an offset of five feet (5') to the outboard side of the land-based sediment excavation limits shown on the Remediation Plan drawing S-4 (sheet 05 of 49) by Amec Earth & Environmental, Inc. We understand that the turbidity wall sheet piling will include intermittent penetrations above the mudline to allow water passage and prevent differential hydrostatic pressure across the wall. The design considers a top of sheet (T.O.S.) elevation at +8.0 with a differential water level of one foot (1') across the wall to account for wave loading. Additionally, the design also considers a current load based on velocity of six feet per second (6 fps).

As designed, the turbidity wall in the deeper areas of the river is supported by cantilevered king piles (composite HP12x74 / paired AZ-18 sheet piling, or eq.) installed at 16.5' intervals along the wall. The design toe depth for the king piles is thirty feet (30') below the mudline at locations where the mudline is below elevation -8 but at or above elevation -12. The design toe depth is twenty-five feet (25') below the mudline for king piles installed where the mudline is at or above elevation -8. The design of the king pile supported barrier wall also recommends a light waler along the top of the turbidity wall sheet piling between the king piles to limit deflection of the intermediate sheets. The turbidity wall at shallower areas may be constructed using cantilevered sheet piling as an alternate to the spaced king piles based on the following criteria:

Cantilevered Turbidity Wall Criteria

Mudline El.	Sheet Section	Min. Toe Depth	Total Sht. Length (T.O.S. @ +8.0)
-2 and above	AZ-13	18'	28'
-2 to -4	AZ-13	19'	31'
-4 to -6	AZ-13	20'	34'
-6 to -8	AZ-13	22'	38"

The barrier wall design uses wind and current loading parameters, and, follows analysis procedures presented in Amec's 9.9.07 Design Report, App. 6, Part 3. Soil parameters used for the turbidity wall design were also inferred from data presented within previous design analysis and evaluations by Amec and others which was provided by Sevenson.

Alternate HP and sheet piling sections may be used pending a review of the proposed substitution and acceptance by the Engineer.

Overflow Weirs

Based on a review of tidal data for this site, the area that will be contained within the turbidity wall, and limiting the differential water pressures across the turbidity wall, this design also specifies intermittent overflow weirs along the turbidity wall which will be protected by geotextile filters. The overflow weirs were evaluated as submerged and two-sided contracted weirs and sized to accommodate tidal fluctuations. The design estimates that a total of thirty-seven linear feet (37 l.f.) of weir (approx. 9 pairs of AZ sht. plg.), with a crest at elevation +0.1, is required.

Attachments

This submittal includes the following attachments:

1. Turbidity Wall King Pile / Cantilevered sheet piling design calculations (4 sheets),
2. Laterally loaded pile analysis "LPile" output (6 sheets),
3. Cantilevered wall design Pile buck "SPW 911" analysis output (4 sheets),
4. Drawing SK-1 with Turbidity Wall plan detail and waler recommendation,
5. Weir evaluation calculations (3 sheets)
6. Remediation Plan Drawing S-4 prepared by Amec with hand markups relative to the turbidity wall.

TURBIDITY WALL

- EVALUATE TURBIDITY CONTAINMENT WALL FOR WIND/CURRENT LOADING

- USE PARAMETERS & PROCEDURES FROM AMEC 9.9.07 DESIGN REPORT, APP. G, PART 3

WIND LOAD: WIND VELOCITY, $V = 43.4$ KNOTS

FLOTATION HT. ABOVE WATER, $S_4 = 8$ ft

$$W_w = 0.00339 V^2 S_4 = 0.00339(43.4)^2(8')$$

$$= 51 \text{ plf}$$

CURRENT LOAD: DEPTH OF WATER, S_d = VARIES

WATER VELOCITY, $U = 5$ fps

CURRENT DIRECTION FACTOR, $f_c = 0.565$ (@ 45°)

$$W_c = 1.92 S_d U^2 f_c = 1.92 (S_d)(5)^2(0.565)$$

$$= (27 \times S_d) \text{ plf}$$

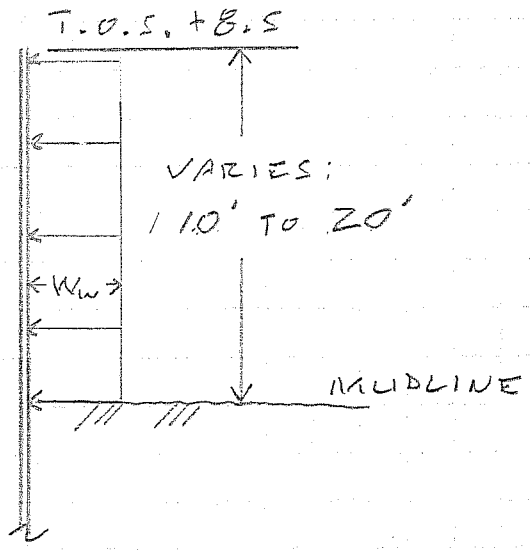
W_c @ M.H.W. OF 8' WILL GOVERN OVER W_w

GGC ENGINEERING·DESIGN GLYNN GEOTECHNICAL ENGINEERING 415 South Transit Street Lockport, New York 14094 voice 716.625.6933 / fax 716.625.6983 www.glynngroup.com	PROJECT: METAL BANK NPL SITE				SHEET NO: 1 / 4
	SUBJECT: TURBIDITY WALL				
	CLIENT: STEVENSON				
	PROJECT NO: 09-1077	SCALE: -	DATE: 5.28.09	BY: JG	CHECKED BY:

EVALUATE TURBIDITY WALL LOADING

FOR MUDLINE FROM -2 TO -12,

T.O.S. @ +8.0' (6.5' +1.5' ACCOUNTING FOR WAVE FORCE)



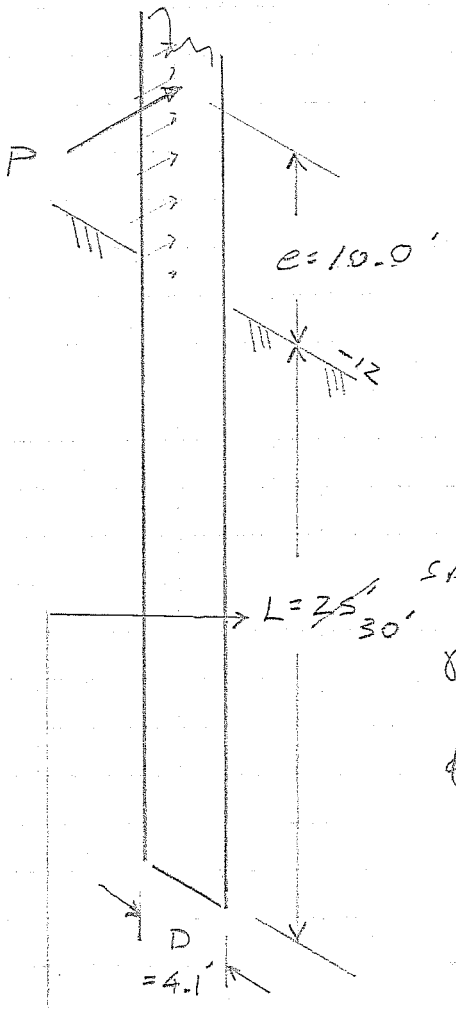
MUDLINE EL.	HT. WATER Sd (ft)	Ww (plf)	EQ. HEAD FOR PILE BUCK = (Ww/Sd)/62.4	
-2	10'	270 plf	0.43'	(AZ-13/18' TOE)
-4	12'	326	"	(AZ-13/19' TOE)
-6	14'	380	"	(AZ-13/20' TOE)
-8	16'	434	"	(AZ-13/22' TOE)
-10	18'	488	"	OR KING PILES @ 16.52' c.-c.
-12	20'	540	"	

GGE
ENGINEERING·DESIGN
GLYNN GEOTECHNICAL ENGINEERING
415 South Transit Street
Lockport, New York 14094
voice 716.625.6933 / fax 716.625.6983
www.glynngroup.com

PROJECT: METAL BANK NPL SITE				SHEET NO: 2/4
SUBJECT: TURBIDITY WALL				
CLIENT: SEVENSON				
PROJECT NO: 09-1077	SCALE: -	DATE: 5.28.09	BY: JS	CHECKED BY:

EVALUATE HP/AZ COMPOSITE KING PILES, 25' TOE

FOR MAX DESIGN LOAD, MUDLINE @ -12



USE BROMS METHOD:

$e/L = 10/25 = 0.4$

$L/D = 25/4.1 = 6.1$

FROM FIG. 6: $P/K_p D^3 \gamma = 15$ (SHT. 4)

$\gamma = 115$ pcf, $\gamma' = 55$ pcf

$\phi = 20°$, $K_p = 1.8$

$$P_{ALL} = \frac{15 \times (K_p D^3 \gamma')}{2} = \frac{15(1.8)(4)^3(55)}{2}$$

$$= \underline{47,520 \text{ lbs.}}$$

LIMIT KING PILE SPACING TO EVERY 4TH SHT. PR.

$$F.O.S. = \frac{P_{ALL}}{P} = \frac{47,520 \text{ lbs.}}{4 \times 4.13' \times 540 \text{ plf}} = \frac{47,520}{18,920} = \underline{5.3}$$

O.K.

FROM LPILE ANALYSIS INCREASE TOE TO 30'

GGE
ENGINEERING·DESIGN
GLYNN GEOTECHNICAL ENGINEERING
415 South Transit Street
Lockport, New York 14094
voice 716.625.6933 / fax 716.625.6983
www.glynngroup.com

PROJECT: METAL BANK HPL SITE				SHEET NO: 3/4
SUBJECT: TURBIDITY WALL				
CLIENT:				
PROJECT NO: 09-1077	SCALE: —	DATE: 5.29.09	BY: JS	CHECKED BY:

PROVIDE TOP WALER FOR INTERMEDIATE SHTS BTWN. KING PILES:

$$M_{WALER} = \left(\frac{540 \text{ plf}}{2} \times (16.52')^2 \right) / 8 = 9{,}210 \text{ lb.ft}$$

$$S_{REQ'D\ (F_y = 36\ ksi)} = \frac{9{,}210 \times \frac{12}{1000}}{0.6 \times 36\ ksi} = 5.11\ in^3$$

$$S_{REQ'D\ (F_y = 50\ ksi)} = 110.5 / 0.6 \times 50\ ksi = 3.68\ in^3$$

WALER OPTIONS: 36 ksi HP8x36 (WEAK OR STRONG)
50 ksi W8x21 (WEAK OR STRONG)

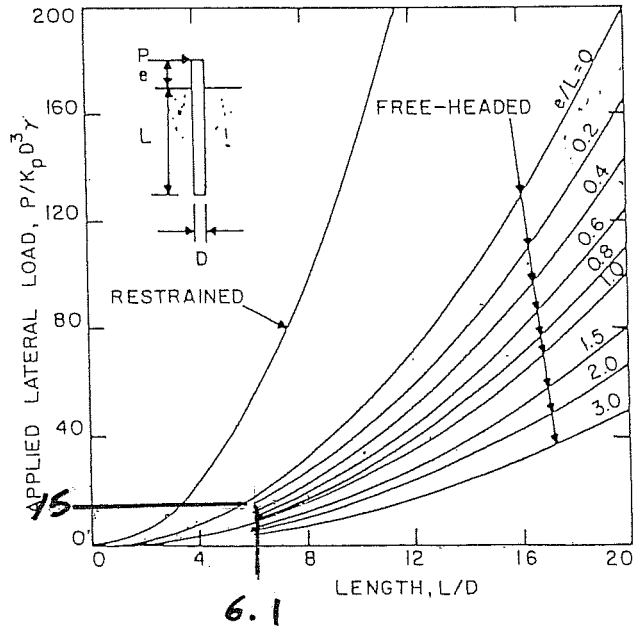
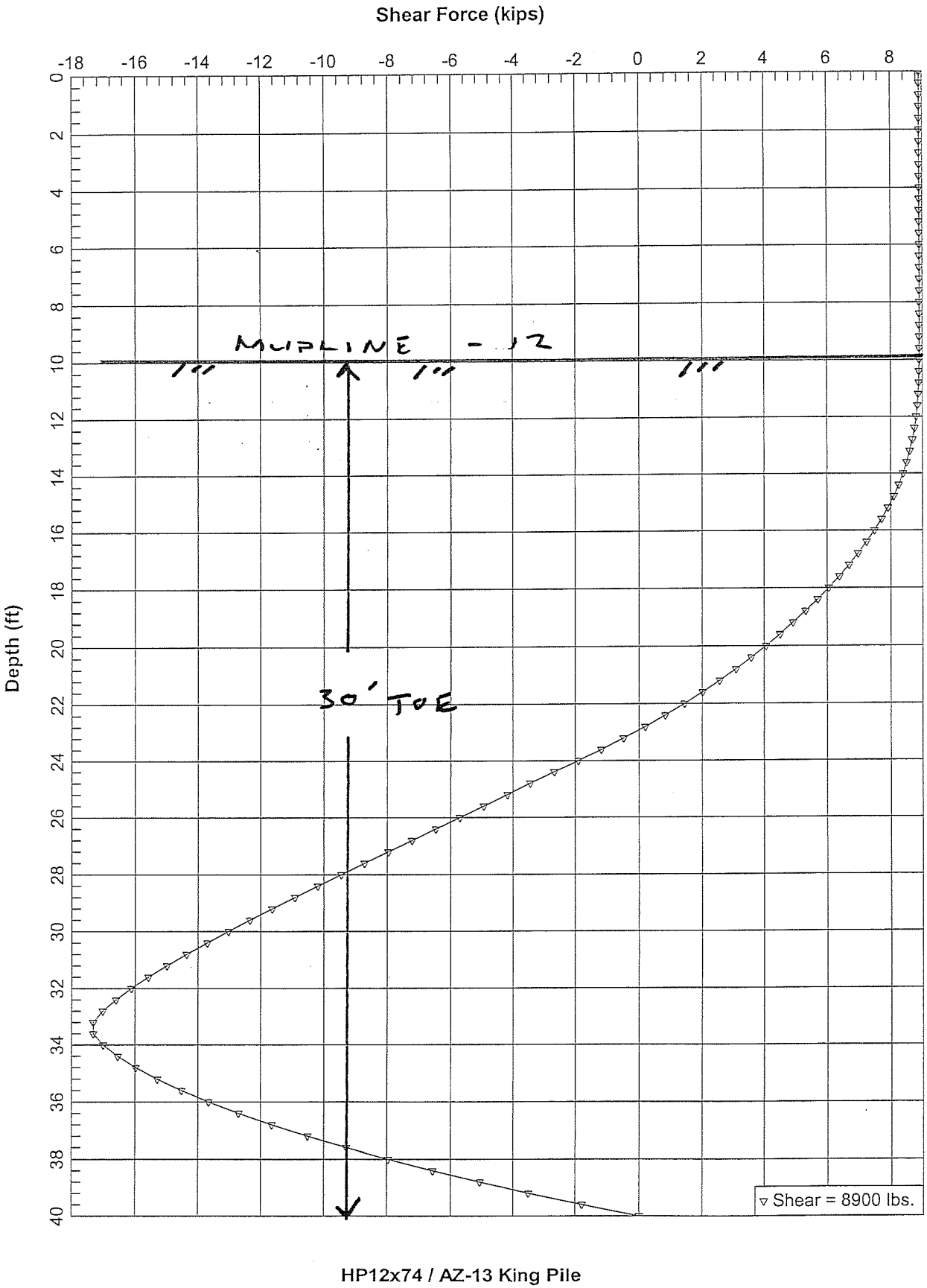


FIG. 6.—ULTIMATE LATERAL RESISTANCE FOR COHESIONLESS SOILS RELATED TO EMBEDMENT LENGTH

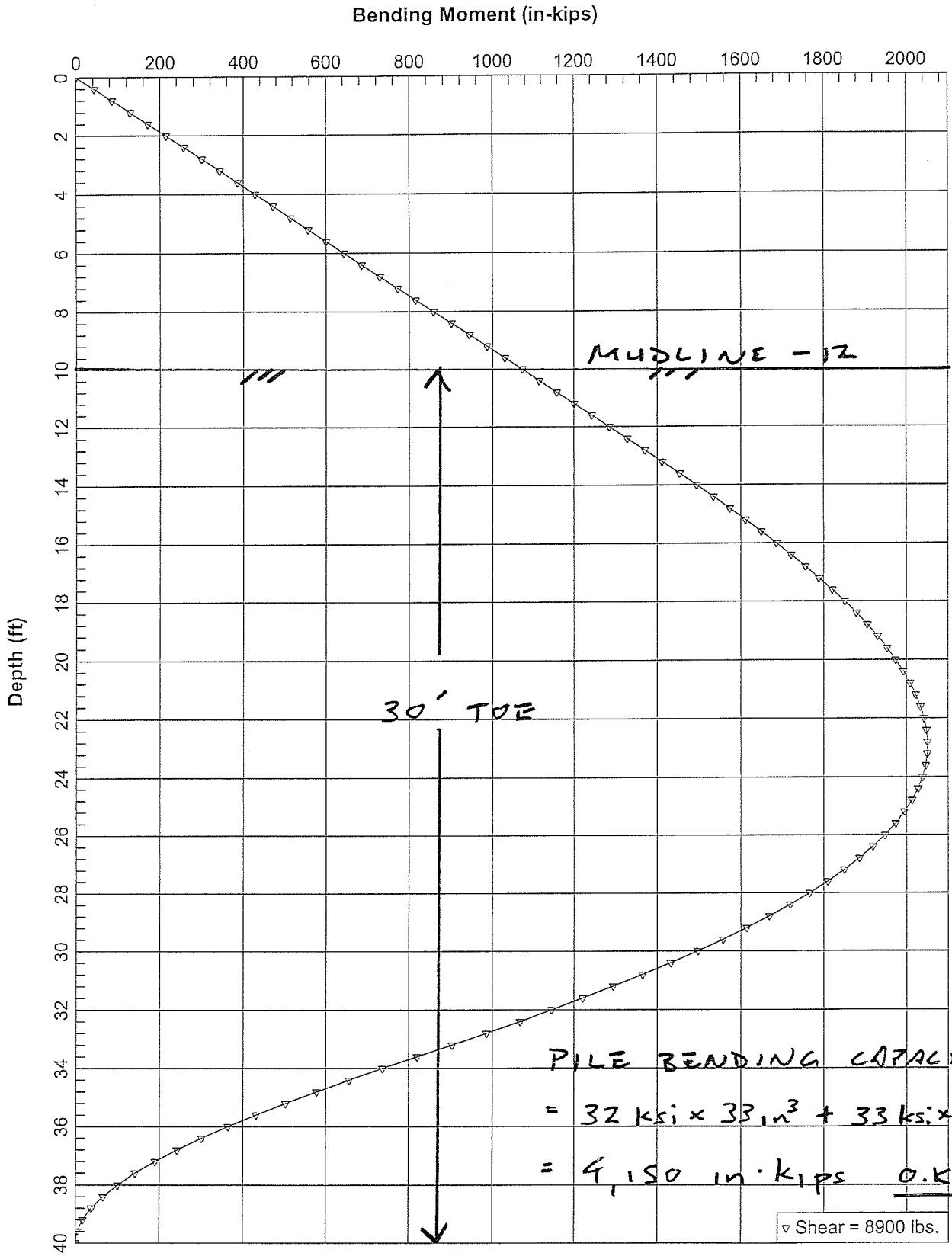
FIG. 6 FOR BROMS METHOD ANALYSIS "DESIGN OF LATERALLY LOADED PILES" 5/65 ASCE JOURNAL

GGE
ENGINEERING·DESIGN
GLYNN GEOTECHNICAL ENGINEERING
415 South Transit Street
Lockport, New York 14094
voice 716.625.6933 / fax 716.625.6983
www.glynngroup.com

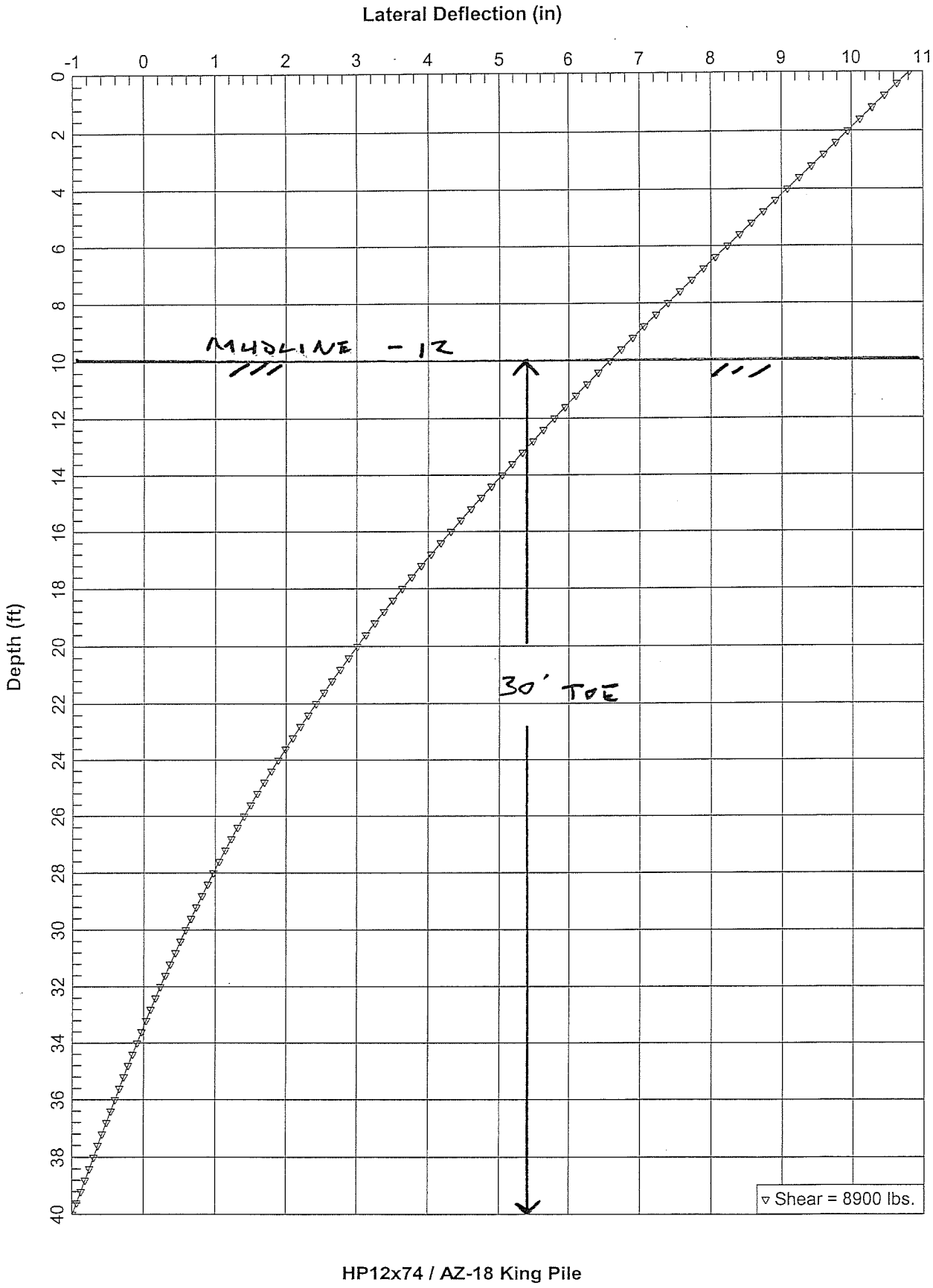
PROJECT: METAL BAND NPL SITE				SHEET NO: 4 / 9
SUBJECT: TURBIDITY WALL				
CLIENT: SEVENSON				
PROJECT NO: 09-1077	SCALE:	DATE: 5.28.09	BY: JS	CHECKED BY:



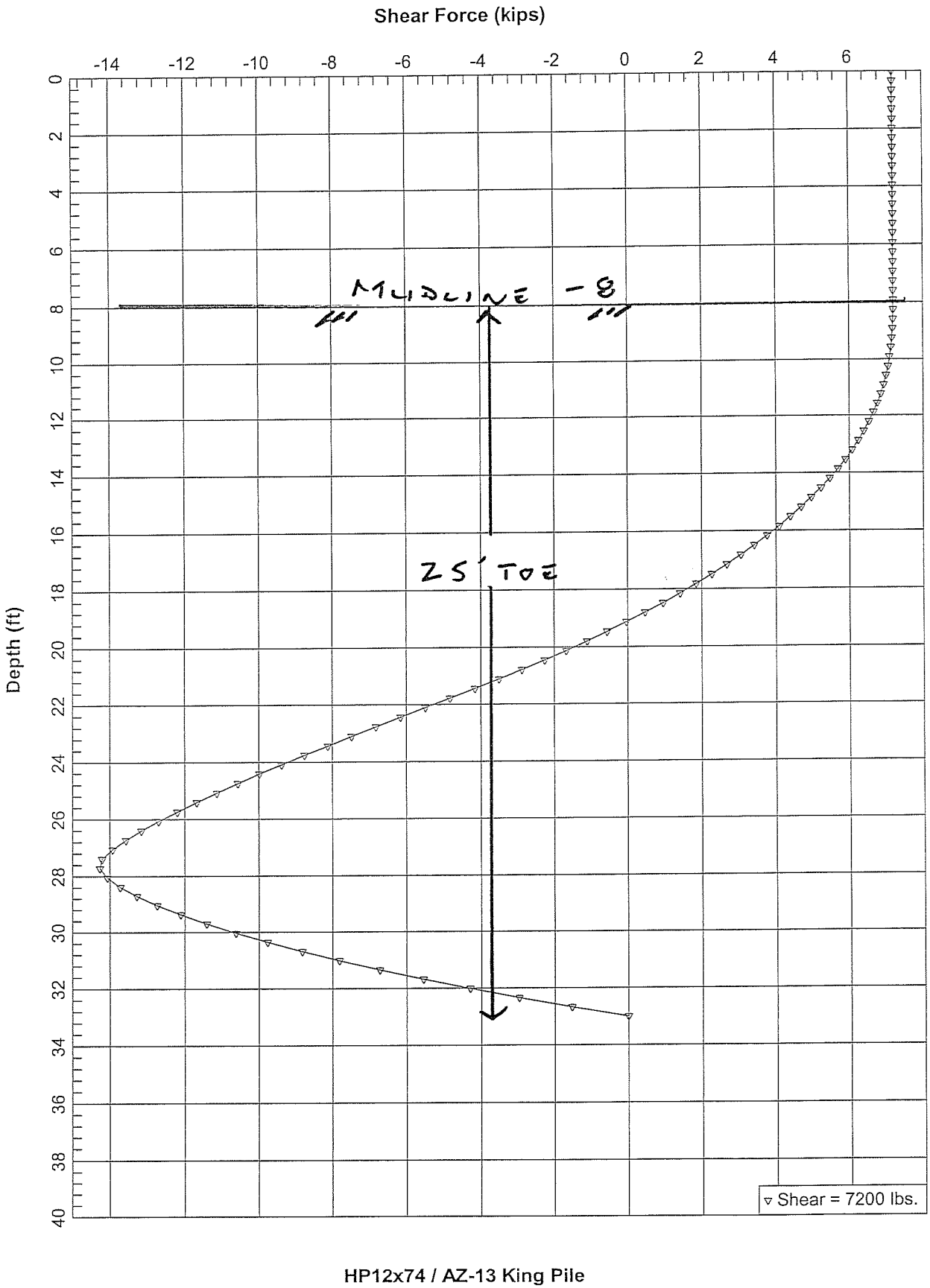
HP12x74 / AZ-13 King Pile



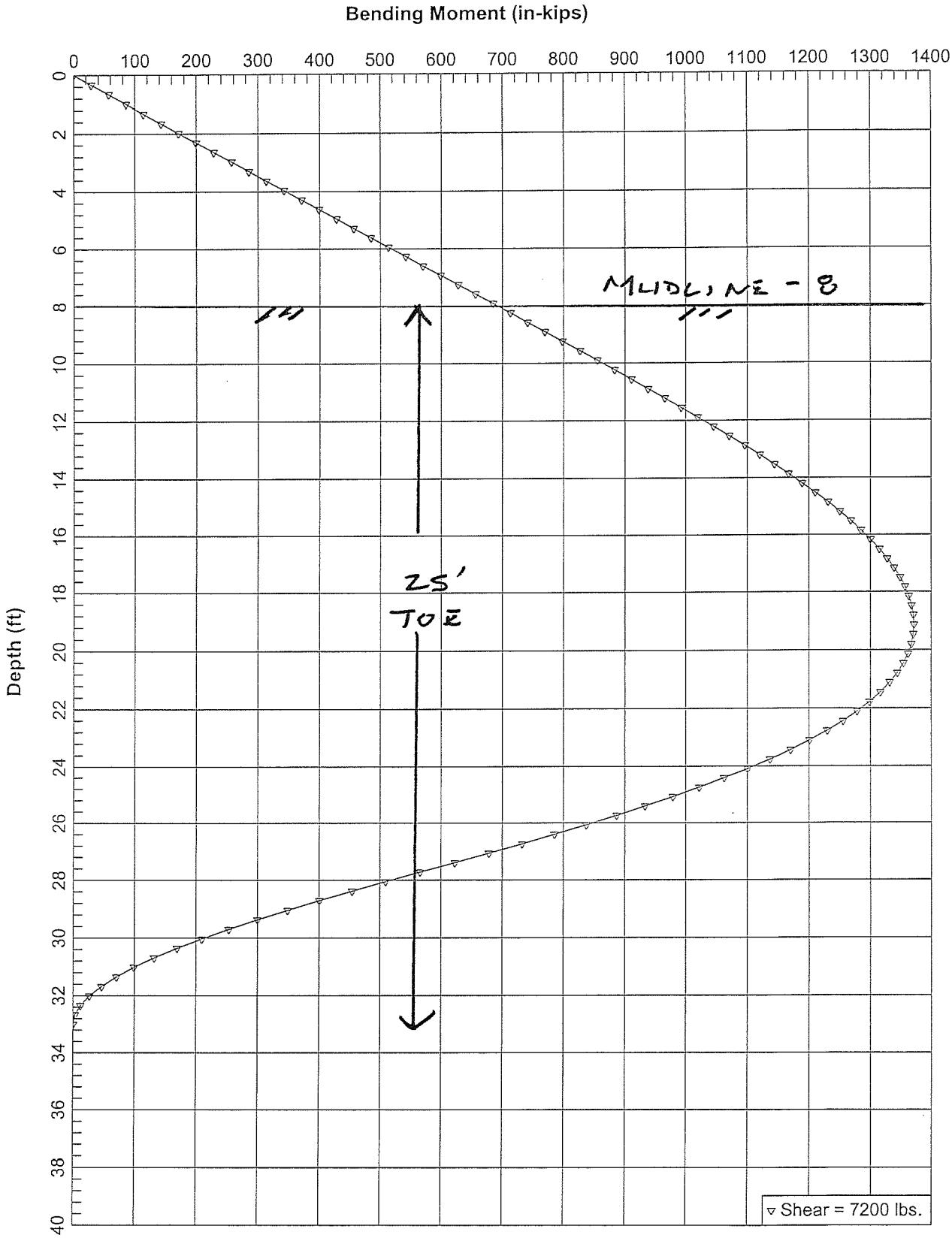
HP12x74 / AZ-18 King Pile



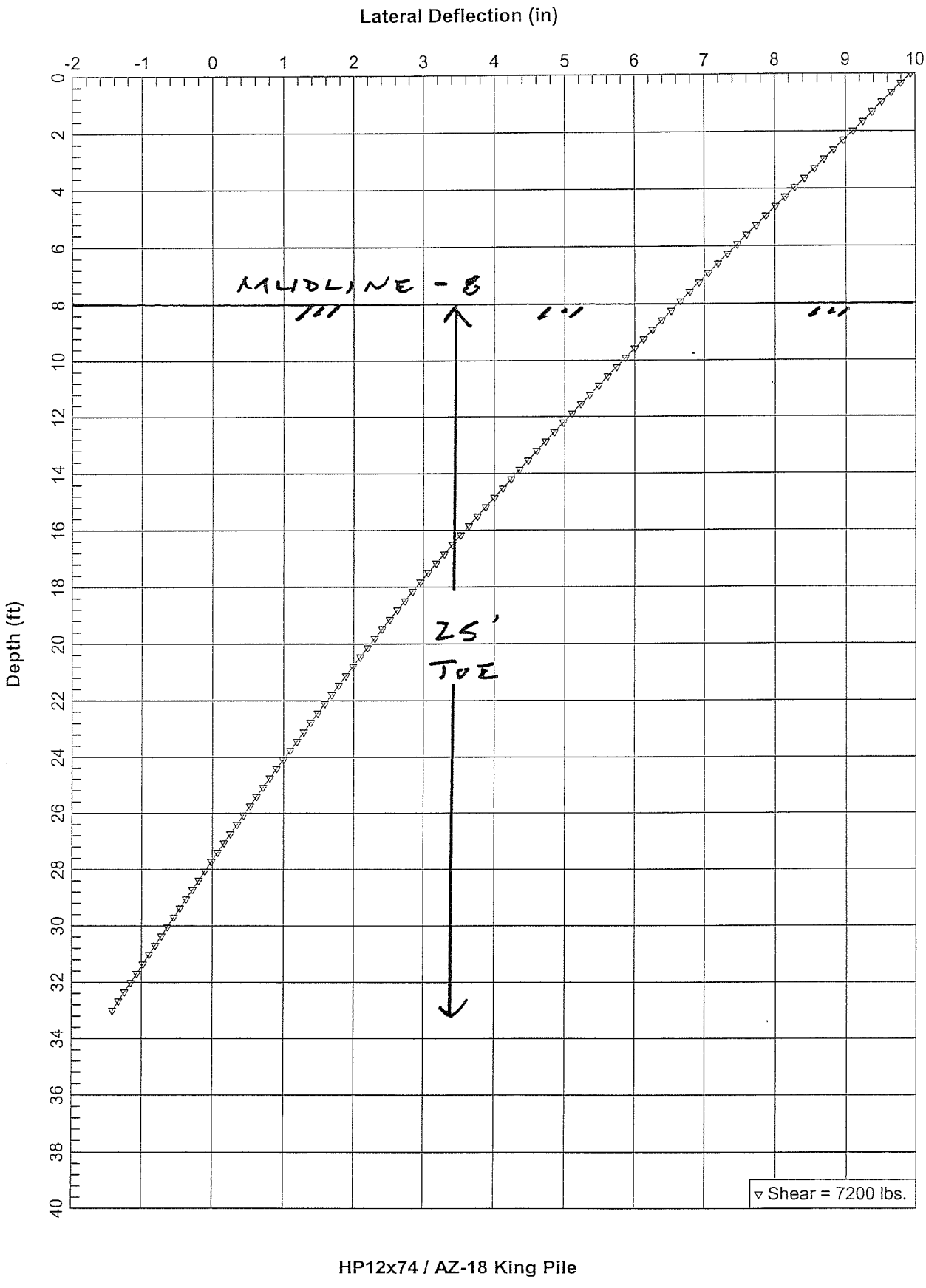
HP12x74 / AZ-18 King Pile



HP12x74 / AZ-13 King Pile



HP12x74 / AZ-18 King Pile


Lateral Deflection (in)
-2
-1
0
1
2
3
4
5
6
7
8
9
10
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
MUDLINE - 8
1"
1"
1"
25'
TOE
▽ Shear = 7200 lbs.
HP12x74 / AZ-18 King Pile

Client: Sevenson Environmental Services

Title: Metal Bank NPL Site Turbidity Wall, Mudline @ -2

Designer: jeg

Page: 1

Date: 5.29.09

Sheet: AZ13

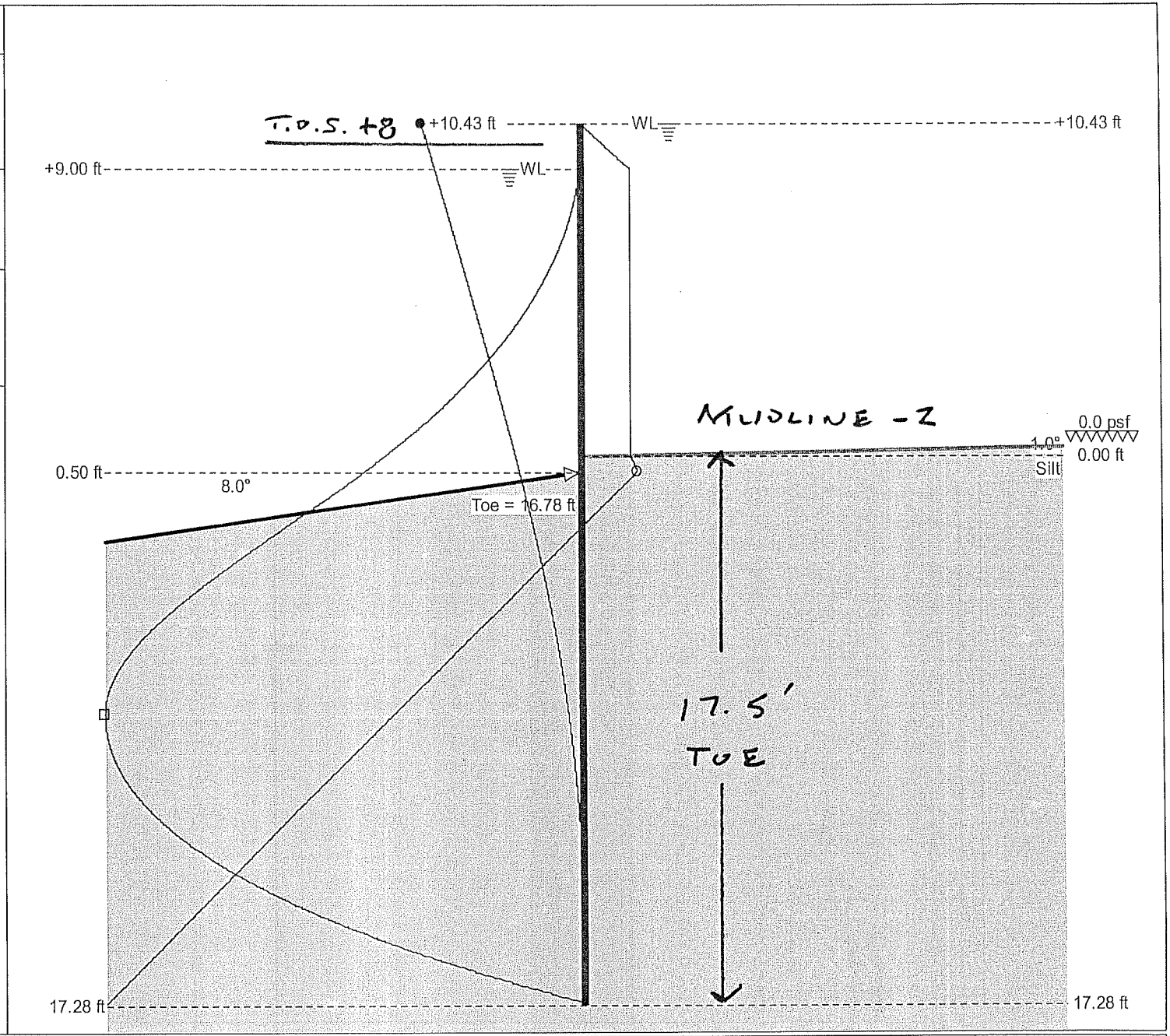
Pressure: Rankine

FOS: 1.0 (K_p÷1.2; C÷1.2)

Toe: Cantilever

Maximum		d (ft)
○	102.3 psf	0.50
□	10335.9 ftlb/ft	8.16
●	1.0 in	-10.43

T.O.S. +8
W.L. @ T.O.S.
Mudline @ -2'
Wc = 270plf = WL + 0.43'



Glynn Geotechnical Engineering

415 South Transit Street
Lockport, NY 14094
Tel: 716.625.6933
Fax: 716.625.6983

SPW911, v2.20

Email: pilebuck@pilebuck.com
Web: www.pilebuck.com

Client: Sevenson Environmental Services

Title: Metal Bank NPL Site Turbidity Wall, Mudline @ -4

Designer: jeg

Page: 1

Date: 5.29.09

Sheet: AZ13

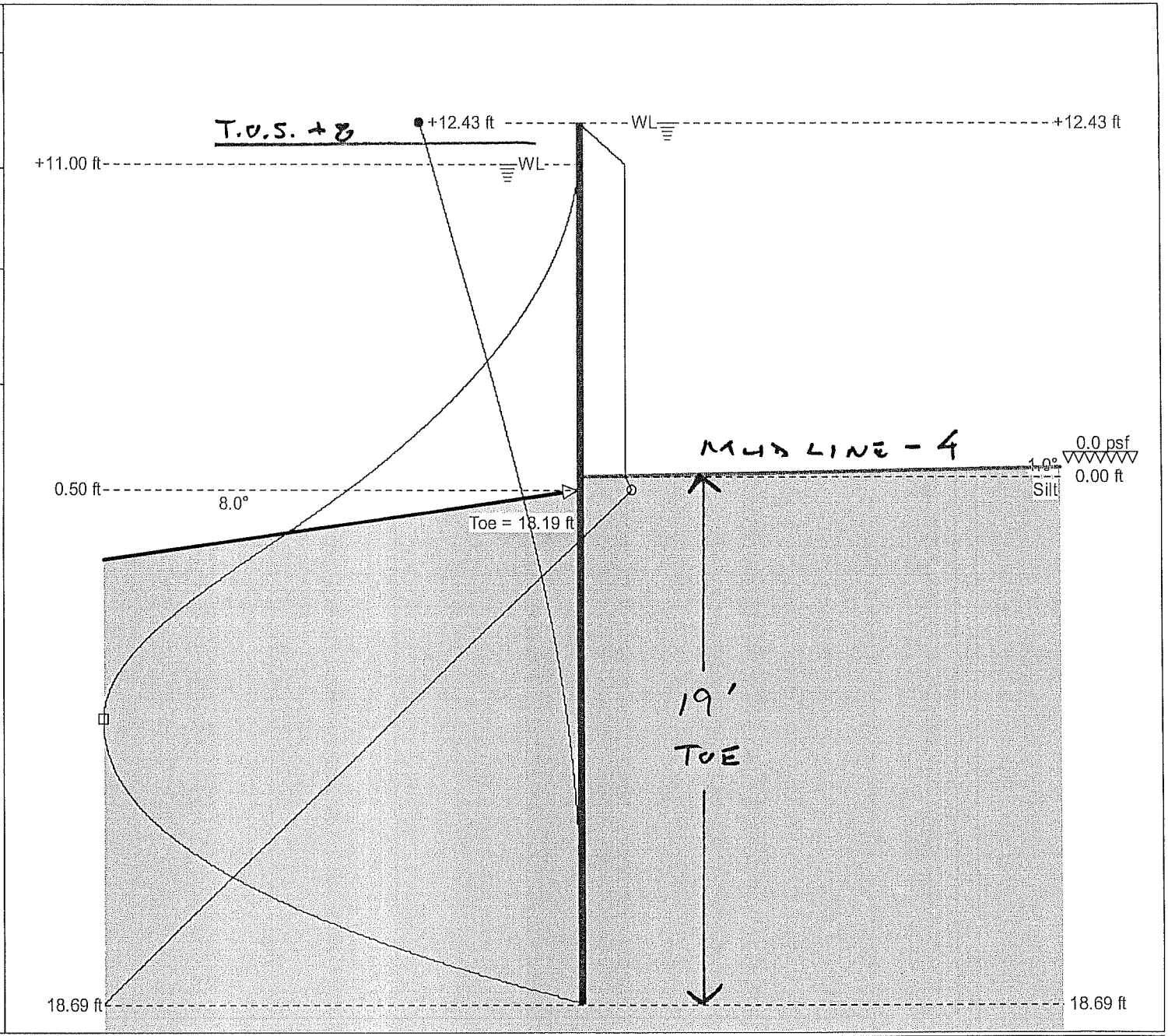
Pressure: Rankine

FOS: 1.0 (K_p÷1.2; C÷1.2)

Toe: Cantilever

Maximum		d (ft)
○	102.3 psf	0.50
□	13750.4 ftlb/ft	8.66
●	1.6 in	-12.43

T.O.S. +8
W.L. @ T.O.S.
Mudline @ -4'
Wc = 326plf = WL + 0.43'



Glynn Geotechnical Engineering

415 South Transit Street
Lockport, NY 14094
Tel: 716.625.6933
Fax: 716.625.6983

SPW911, v2.20

Client: Sevenson Environmental Services

Title: Metal Bank NPL Site Turbidity Wall, Mudline @ -6

Designer: jeg

Page: 1

Date: 5.29.09

Sheet: AZ13

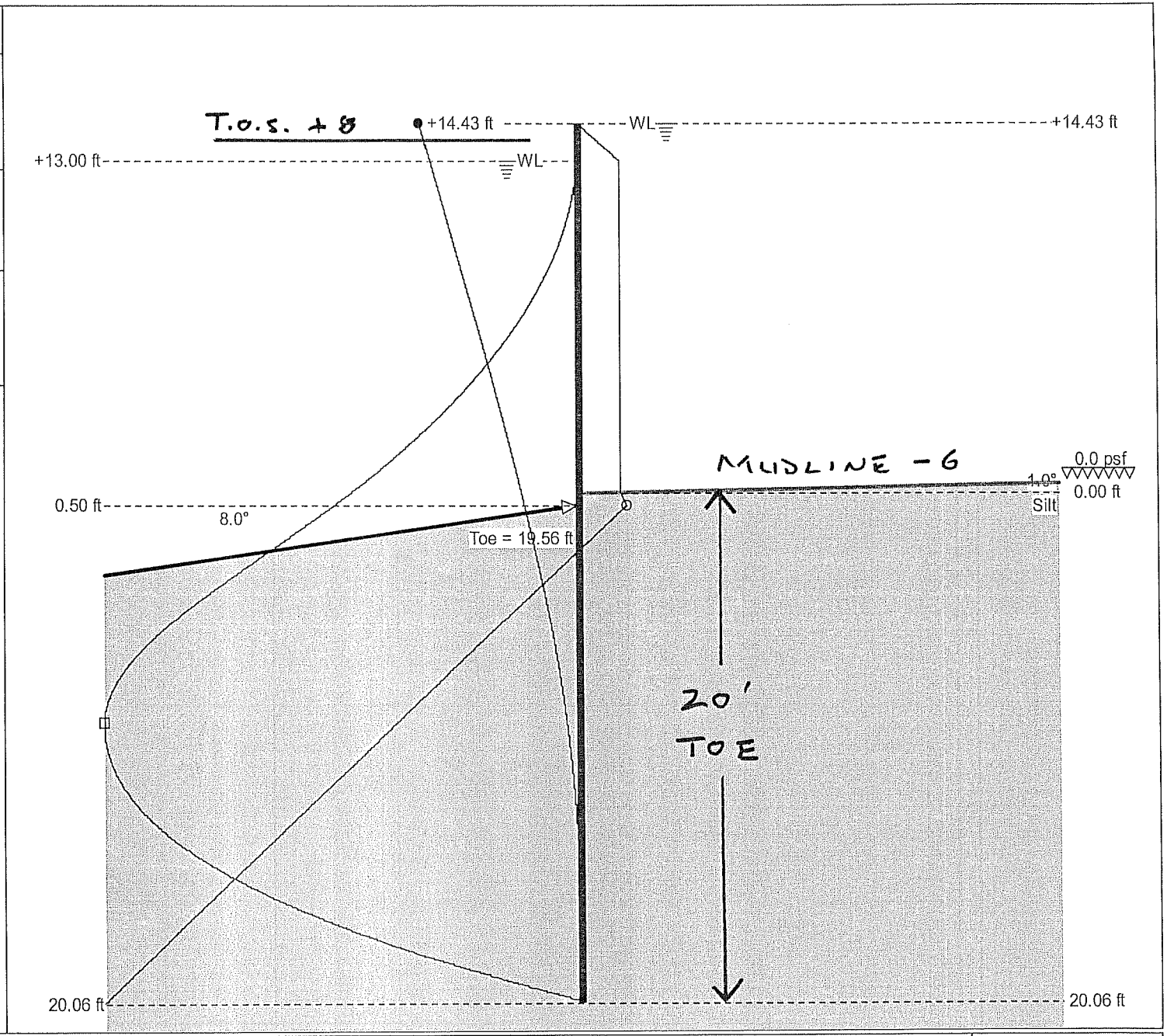
Pressure: Rankine

FOS: 1.0 ($K_p \div 1.2$; $C \div 1.2$)

Toe: Cantilever

Maximum		d (ft)
○	102.3 psf	0.50
□	17609.1 ftlb/ft	9.11
●	2.6 in	-14.43

T.O.S. +8
W.L. @ T.O.S.
Mudline @ -6'
Wc = 380plf = WL + 0.43'



Glynn Geotechnical Engineering

415 South Transit Street
Lockport, NY 14094
Tel: 716.625.6933
Fax: 716.625.6983

SPW911, v2.20

Client: Sevenson Environmental Services

Title: Metal Bank NPL Site Turbidity Wall, Mudline @ -8

Designer: jeg

Page: 1

Date: 5.29.09

Sheet: AZ13

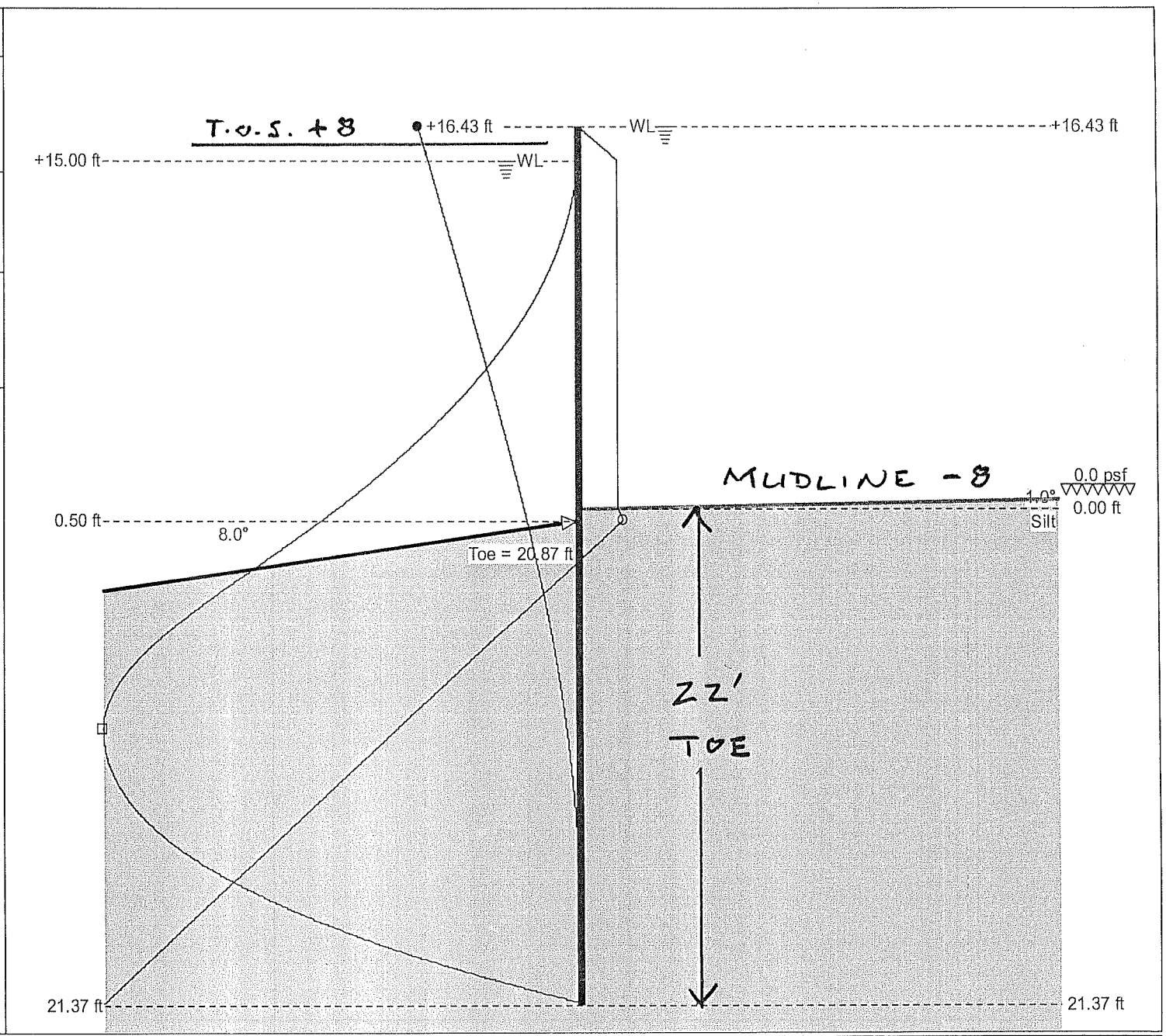
Pressure: Rankine

FOS: 1.0 ($K_p \div 1.2$; C÷1.2)

Toe: Cantilever

Maximum		d (ft)
○	102.3 psf	0.50
□	21903.6 ftlb/ft	9.56
●	3.9 in	-16.43

T.O.S. +8
W.L. @ T.O.S.
Mudline @ -8'
Wc = 434plf = WL + 0.43'

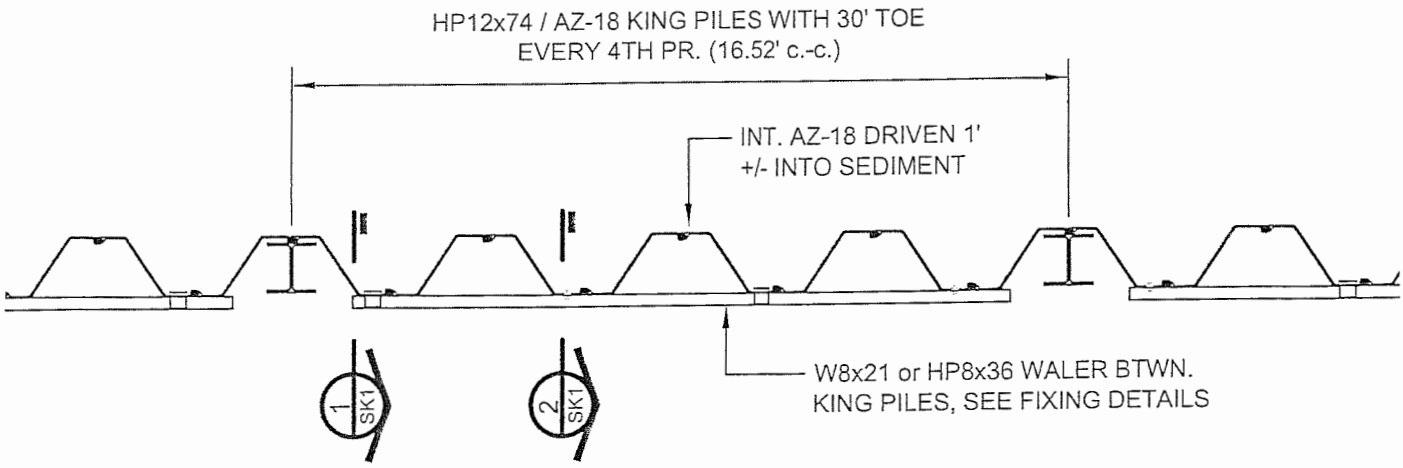


Glynn Geotechnical Engineering

415 South Transit Street
Lockport, NY 14094
Tel: 716.625.6933
Fax: 716.625.6983

SPW911, v2.20

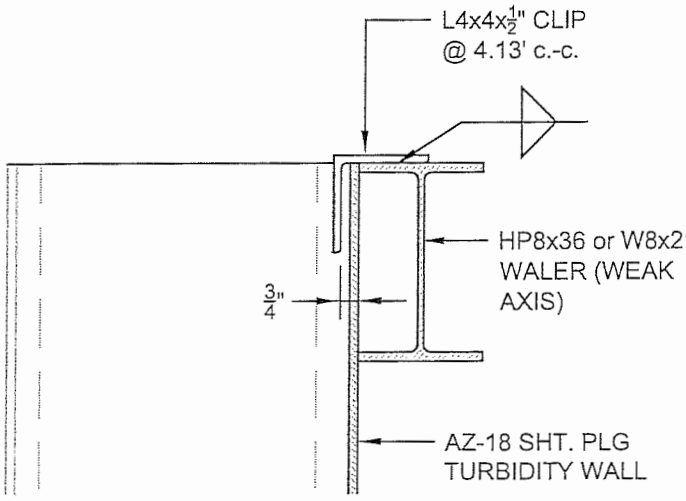
Email: pilebuck@pilebuck.com
Web: www.pilebuck.com



KING PILE SUPPORTED TURBIDITY WALL - PARTIAL PLAN

A / SK1

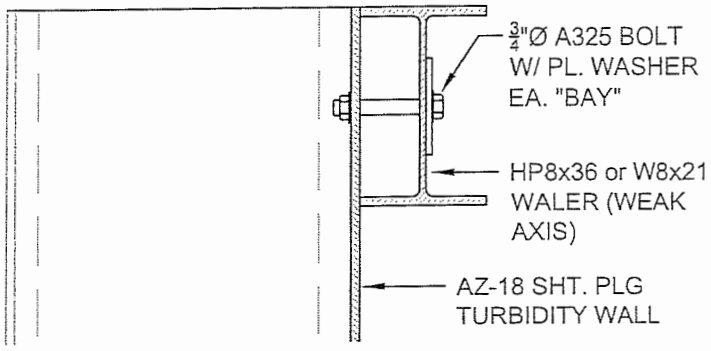
SCALE: $\frac{1}{4}$" = 1'-0"



WALE FIXING DETAIL (HUNG ALT.)

1 / SK1

SCALE: $1\frac{1}{2}$" = 10'



WALE FIXING DETAIL (BOLTED ALT.)

2 / SK1

SCALE: $1\frac{1}{2}$" = 10'

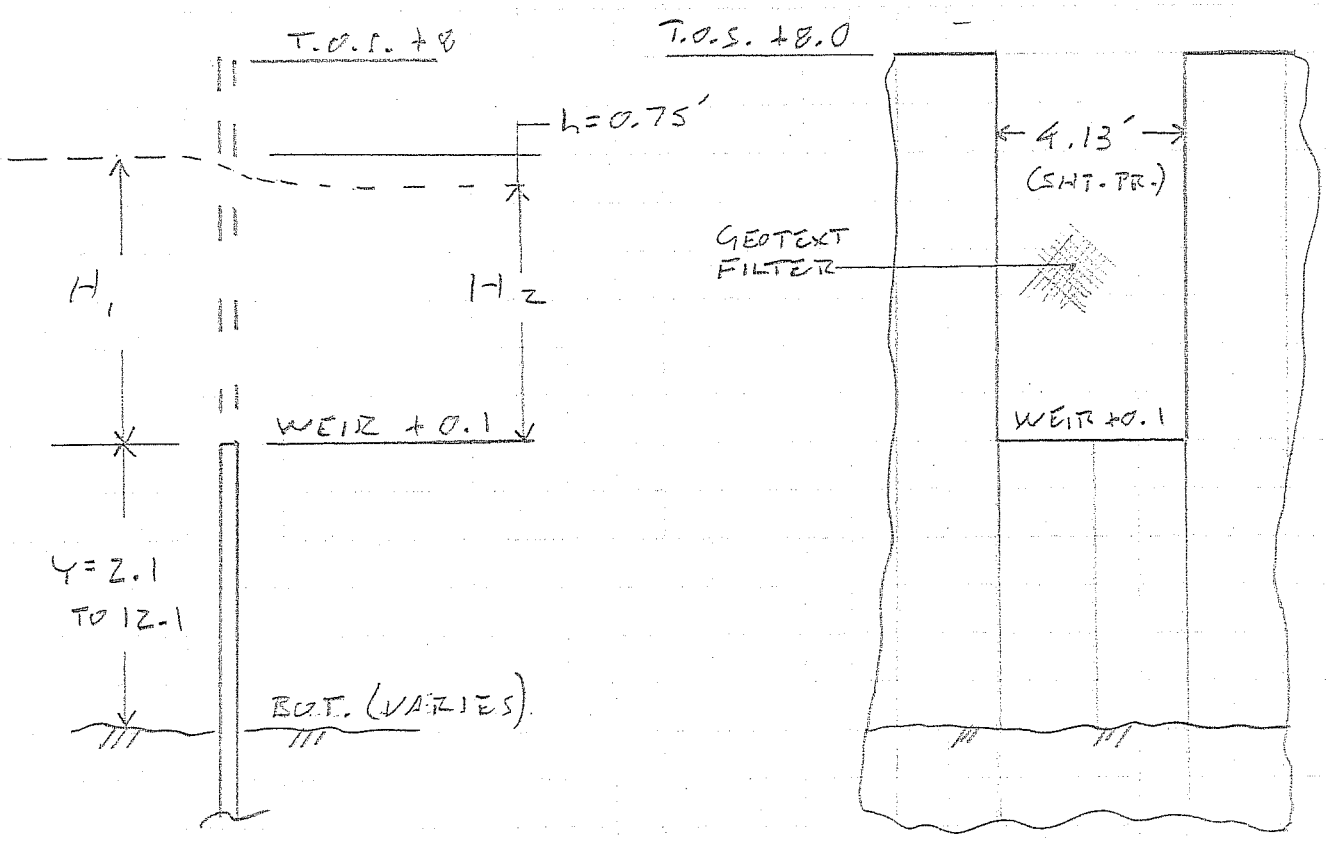
PREPARED FOR:
Sevenson Environmental Services, Inc.

GGE
ENGINEERING • DESIGN
GLYNN GEOTECHNICAL ENGINEERING
415 S. TRANSIT STREET
LOCKPORT, NEW YORK 14094
VOICE (716) 625 - 6933 / FAX (716) 625-6983
www.glynngroup.com

PROJECT:				SHEET NO.:
METAL BANK NPL SITE, PHILA., PA.				SK-1
SUBJECT:				
KING PILE SUPPORTED TURBIDITY WALL				
CLIENT:				
SEVENSON ENVIRONMENTAL SERVICES				
PROJ. NO.:	SCALE:	DATE:	BY:	
09-1077	AS NOTED	5.29.09	jeg	

EVALATE SUBMERGED RECT. WEIRS

FOR BALANCED WATER



2-SIDED CONTRACTED WEIR:

$$b_{eff} = b_{ACT} - (0.1)(N_1)(h) = 4.13' - (0.1)(2)(0.5$$

$$= 4.03', \text{ SAY } 4'$$

$$C_{1\,(Y=2:1,\,12:1)} = \left[0.6035 + 0.0813\left(\frac{H}{Y}\right) + \frac{0.000295}{Y}\right] \times \left[1 + \frac{0.00361}{H}\right]^{1.5}$$

GGE ENGINEERING·DESIGN GLYNN GEOTECHNICAL ENGINEERING 415 South Transit Street Lockport, New York 14094 voice 716.625.6933 / fax 716.625.6983 www.glynngroup.com	PROJECT: METAL BANK NPL SITE			SHEET NO: 1 / 3
	SUBJECT: TURBIDITY WALL (WEIR)			
	CLIENT: SEVENSON			
PROJECT NO: 09-1077	SCALE: —	DATE: 6.1.09	BY: JG	CHECKED BY:

$$C_{1\,(Y=2.1)} = \left[0.6025 + 0.0813\left(\frac{0.75}{2.1}\right) + \frac{0.000295}{2.1}\right]\left[1 + \frac{0.00261}{0.75}\right]^{1.5}$$

$$= 0.632 \times 1.07 = 0.676$$

$$C_{1\,(Y=12.1)} = \left[0.6025 + 0.0813\left(\frac{0.75}{12.1}\right) + \frac{0.000295}{12.1}\right] \times 1.07$$

$$= 0.608 \times 1.07 = 0.651$$

$$Q_{\text{FREE FLOW}\,(Y=2.1)} = \frac{2}{3} C_1 b (2g)^{0.5} (h)^{1.5}$$

$$= \frac{2}{3}(0.676)(4')(2\times 32)^{0.5}(0.75)^{1.5} = \underline{9.37\ \text{cfs}}$$

$$Q_{\text{FREE FLOW}\,(Y=12.1)} = \frac{0.651}{0.676} \times 9.37\ \text{cfs} = \underline{9.02\ \text{cfs}}$$

$$Q_{\text{SUBMERGED}} = Q_{\text{FREE FLOW}}\left[1 - \left(\frac{H_2}{H_1}\right)^{1.5}\right]^{0.385}$$

$\frac{H_2}{H_1}$ VARIES FROM $\frac{5.65}{6.4}$ TO $\frac{0.5}{1.25}$

$= 0.88$ TO 0.4

$\left[1 - \left(\frac{H_2}{H_1}\right)^{1.5}\right]^{0.385}$ 0.51 TO 0.89

GGE
ENGINEERING·DESIGN
GLYNN GEOTECHNICAL ENGINEERING
415 South Transit Street
Lockport, New York 14094
voice 716.625.6933 / fax 716.625.6983
www.glynngroup.com

PROJECT: METAL BANK NPL SITE				SHEET NO: 2/3
SUBJECT: TURBIDITY WALL (WEIRS)				
CLIENT: SEVENSON				
PROJECT NO: 09-1077	SCALE: -	DATE: 6.1.09	BY: JG	CHECKED BY:

EST. CAP. OF SINGLE SUBMERGED WEIR

$Q_{EST.} = 0.7 \times 9.1 \text{ cfs} = 6.37 \text{ cfs}$

TO MATCH TIDAL INFLUENCE:

VOL. DREDGE AREA FROM EL. +0.11 TO +6.91

$= 240{,}800 \text{ S.F.} \times (6.91' - 0.11') = 1.517 \text{ M ft}^3$

RATE OF CHANGE OVER 7.5 HR. TIDE CYCLE

$= 1.517 \text{ M ft}^3 / 7.5 \times (60)^2 = \underline{56 \text{ cfs}}.$

NO. OF 4.13' WEIRS REQ'D $= 56 \text{ cfs} / \frac{6.37 \text{ cfs}}{\text{WEIR}}$

$= \underline{8.8}$

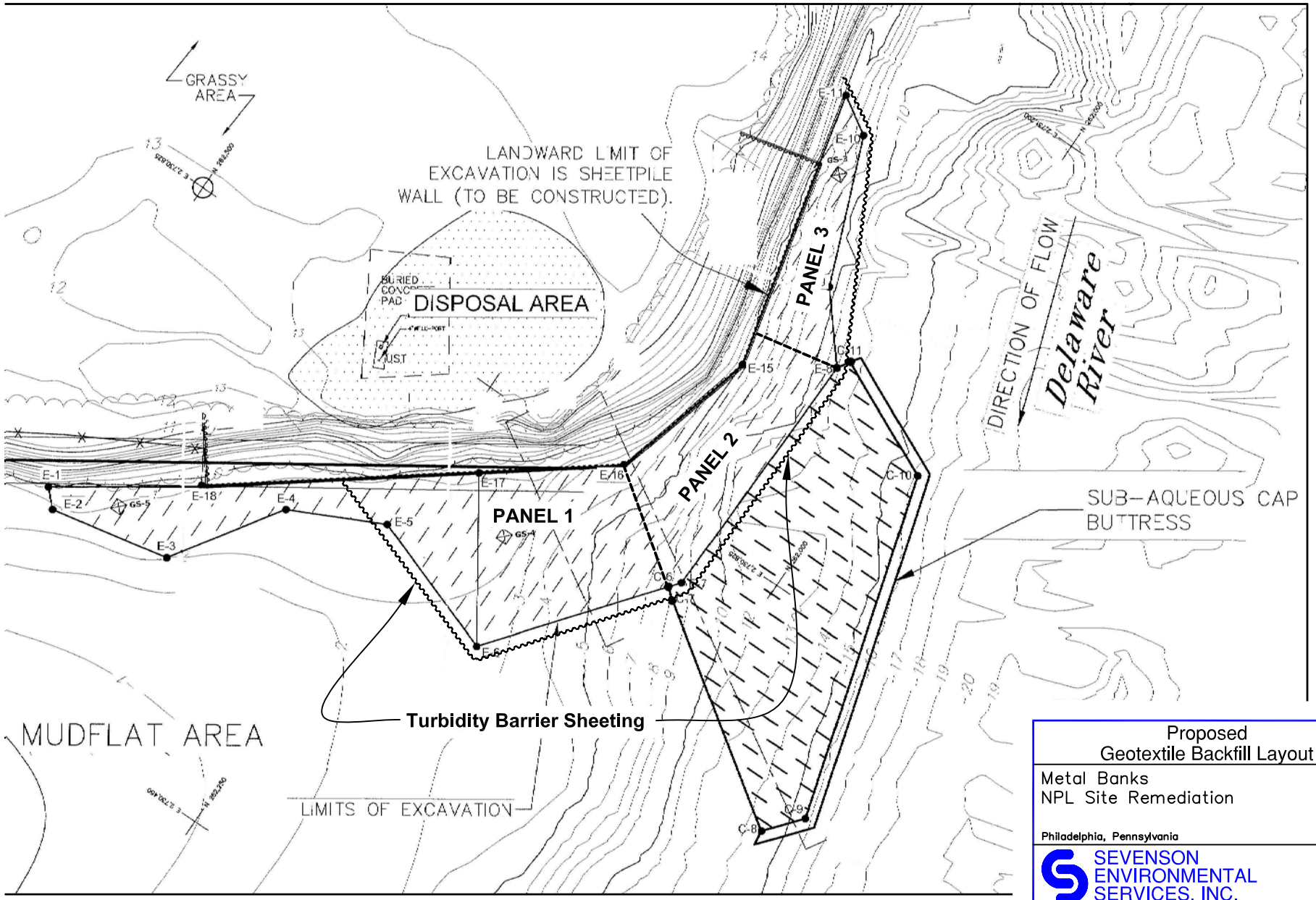
USE: (9) 4.13' WIDE WEIRS OR

37.2 L.F. OF WEIR

MAX EST. VELOCITY THRU W/GIRS:

$\frac{0.89 \times 9.37 \text{ cfs}}{0.75' \times 4.13'} = \underline{2.7 \text{ fps}}$

GGC ENGINEERING·DESIGN GLYNN GEOTECHNICAL ENGINEERING 415 South Transit Street Lockport, New York 14094 voice 716.625.6933 / fax 716.625.6983 www.glynngroup.com	PROJECT: METAL BANK NPL SITE				SHEET NO: 3 / 3
	SUBJECT: TURBIDITY WALL (W/WEIRS)				
	CLIENT: SELENSON				
	PROJECT NO: 09-1077	SCALE: -	DATE: 6-1-09	BY: JS	CHECKED BY:



Proposed
Geotextile Backfill Layout

Metal Banks
NPL Site Remediation

Philadelphia, Pennsylvania

SEVENSON ENVIRONMENTAL SERVICES, INC.

Appendix
B

DATE:	6/2/09
DRAWN BY:	C. Bigelow
CHECKED BY:	J. Pazderski
CAD FILE:	Geotextile-Layout
SCALE:	none

Appendix C:

Decision Making Turbidity Matrix

Metal Bank NPL Sediment Excavation

Scenario Decision-Making Matrix Table

Scenario	Immediate Action	Potential Corrective Actions
Turbidity in excess of 40 NTU or 20% more than the background at the sensor location attributable to site activities. Or visible turbidity plume attributable to site activities in excess of 100ft from the turbidity curtain.	TtEC will notify Malcolm Pirnie, and modify or cease activities in the river immediately. Work activities will be squenced in the order presented under "Potential Corrective Action".	Step 1: Inspect turbidity curtain and other turbidity containment features for damage or fouling, proper placement, float condition and buoyancy, attachments and anchors, connections between segments, closure at the shore.
		Step 2: Modify Pace of the excavation by slowing the digging rate, slowing the movement of the bucket through the water column, pausing the bucket as it breaks the water surface or similar changes to reduce turbidity production associate with excavating the sediment.
		Step 3: Modify the placement of the excavated sediment into the haul trucks by reducing the load of each truck or other changes to reduce the amount of sediment that might fall back into the work area as the sediment is loaded into the trucks.
		Step 4: Modify procedures for placing the cover material back into the excavation such as reducing the drop height, slowing the pace of placement.
		Step 5: Reposition the placement of the turbidity curtain or other containment features if appropriate.
		Step 6: Install secondary or tertiary turbidity containment equipment such as smaller curtains directly around the work area inside of the main curtain, or additional area-wide curtains (monitoring points will not be moved if that is the case).
		Step 7: If immediate actions are not successful within 60 minutes in reducing turbidity as indicated by the monitoring instruments or by visual means, excavation operations shall cease as specified in Section 02900, Section 3.11.
		Step 8: In the event that turbidity does not normalize within 60 minutes in reducing turbidity work will cease.
Turbidity in excess of 40 NTU or 20% more than the background at the sensor location attributable to site equipment. Or visible turbidity plume attributable to site activities in excess of 100ft from the turbidity curtain.	TtEC will notify Malcolm Pirnie, and modify or cease activities in the river immediately. Work activities will be squenced in the order presented under "Potential Corrective Action".	Step 1: Modify or change the digging bucket so that water drains from it in a slower or more uniform manner, reducing the amount of sediment that washes out.
		Step 2: Modify or change the bucket used to place backfill so that the backfill can be spread more uniformly and with less impact to the native sediments.
		Step 3: Change the placement technique used to place the rock mattresses so that they can be laid onto the river bottom more gently.
		Step 4: Reposition the placement of the turbidity curtain or other containment features if appropriate.
		Step 5: Install secondary or tertiary turbidity containment equipment such as smaller curtains directly around the work area inside of the main curtain, or additional area-wide curtains (monitoring points will not be moved if that is the case).
		Step 6: If immediate actions are not successful within 60 minutes in reducing turbidity as indicated by the monitoring instruments or by visual means, excavation operations shall cease as specified in Section 02900, Section 3.11.
		Step 7: In the event that turbidity does not normalize within 60 minutes in reducing turbidity work will cease.

Metal Bank NPL Sediment Excavation

Scenario Decision-Making Matrix Table

Turbidity in excess of 40 NTU or 20% more than the background at the sensor location, or visible turbidity plume, attributed to vessel traffic on the Delaware River.	TtEC will notify Malcolm Pirnie and evaluate the need to modify or suspend activities, if appropriate to control turbidity. Work activities will be squenced in the order presented under "Potential Corrective Action".	Step 1: TtEC will modify construction activities or suspend construction activities in advance of large ship traffic if possible. Step 2: If small vessel traffic from the Quaker City Yacht Club is determined to be the cause, TtEC will provide signage or other education as appropriate for traffic from Quaker City Yacht Club. Step 3: Adjustment of the turbidity curtain to better line up with wave action from vessels, if possible.
Turbidity in excess of 40 NTU or 20% more than the background at the sensor location, or visible turbidity plume, attributed to abnormal current, tide, wave and weather conditions.	TtEC will notify Malcolm Pirnie and evaluate the need to modify or suspend activities, if appropriate to control turbidity excursions.	TtEC will modify construction activities or suspend construction activities as necessary in accordance with the RAWP if conditions are unsuitable for work.
Current velocities causing failure of turbidity curtain or unsafe working conditions.	TtEC will cease river work immediately and notify Malcolm Pirnie of the condition.	TtEC will discontinue river work until conditions are more favorable, or evaluate alternate methods of turbidity control during periods of excessive river currents.
Presence of an oil sheen inside the work zone from site work (i.e. contained within the outer oil boom).	TtEC will continue work while monitoring that the sheen stays within the containment and that containment features (i.e. turbidity curtain, hard oil boom and the inner absorbent boom) are in place and functioning appropriately.	No corrective action necessary.
Presence of an oil sheen outside of the work zone caused by site work.	TtEC will continue stop all work that could potentially cause the sheen and report the sheen to the NRC within 15 minutes in accordance with TtEC's August 2008 Spill and Release Reporting Plan.	TtEC will deploy absorbent material as necessary to mitigate the sheen outside of the work zone.
Presence of oil product in the work zone	TtEC will continue work while monitoring that the product stays within the containment and that containment features (i.e. turbidity curtain, hard oil boom and the inner absorbent boom) are in place and functioning appropriately.	TtEC will maintain the inner absorbent boom as necessary to ensure that product is contained inside the work zone.

Response to US EPA Decision Matrix Regarding Turbidity

Sharon Fang of EPA submitted an email on November 3, 2008 to Malcolm Pirnie in response to the decision matrix included in Malcolm Pirnie's October 21, 2008 letter. Our responses to EPA's email are presented below.

7) EPA requested the matrix reflect a sequencing of actions with a notation that sequencing will be followed if the solution is not readily apparent. In the case where the solution is readily apparent, the most likely fix should be the first one tried.

See attached Decision Matrix. This document has been modified to reflect a sequencing of actions to address excess turbidity if it should occur.

8) The scenario of Turbidity in excess should be "the greater of 40 NTU or 20% more than the background." We talked about an interim trigger to allow for additional time to modify work activities.

Although there is already a time buffer of 60 minutes in excess of the turbidity thresholds already built into sediment excavation program before work in the river has to cease, we have agreed to put an additional level of protection by creating an interim trigger of 35 NTUs or 15% more than the background. At these triggers, we will instruct TtEC to adjust their sediment removal activities in an effort to reduce turbidity. This would include slowing down the removal activities to reduce the level of disturbance at the river bottom.

9) Spec 2900-18 Section 3.11.2 states that water samples should be taken if the criteria is exceeded for 60 minutes. This would require the ability to mobilize the correct equipment and personnel to perform the sampling prior to this point in time.

TtEC will have appropriate equipment and personnel readily available on-site to meet this requirement.

10) Add an additional item indicating when construction activities can recommence.

Construction activities can commence after the turbidity measurements are below the applicable thresholds (40 NTU or 20% above background) for a period of 60 minutes.

11) Further define "current velocities causing failure of turbidity curtain or unsafe working conditions" to a quantifiable measure.

The performance of the turbidity curtain will to be based on turbidity measurements consistent with the design specifications. TtEC's site safety officer will determine unsafe working conditions based on field considering a number of factors including current velocities, wave action, tides, etc. consistent with their health and safety plan and the standard of practice.

12) For potential corrective action for "presence of oil product in the work zone" add absorbent pads or possibly an active skimming system.

TtEC will use absorbent pads and other effective means to collect “free product” contained in the work zone.

13**) Dan from Ttec stated that the normal operating procedure would include allowing the excavator bucket to drain prior to loading. Reword the third potential corrective action in order to more clearly state what type of work modifications would be implemented.**

Attachment has been revised to address this comment.

Turbidity Control Layout

Metal Bank
NPL Remediation

Philadelphia, Pennsylvania

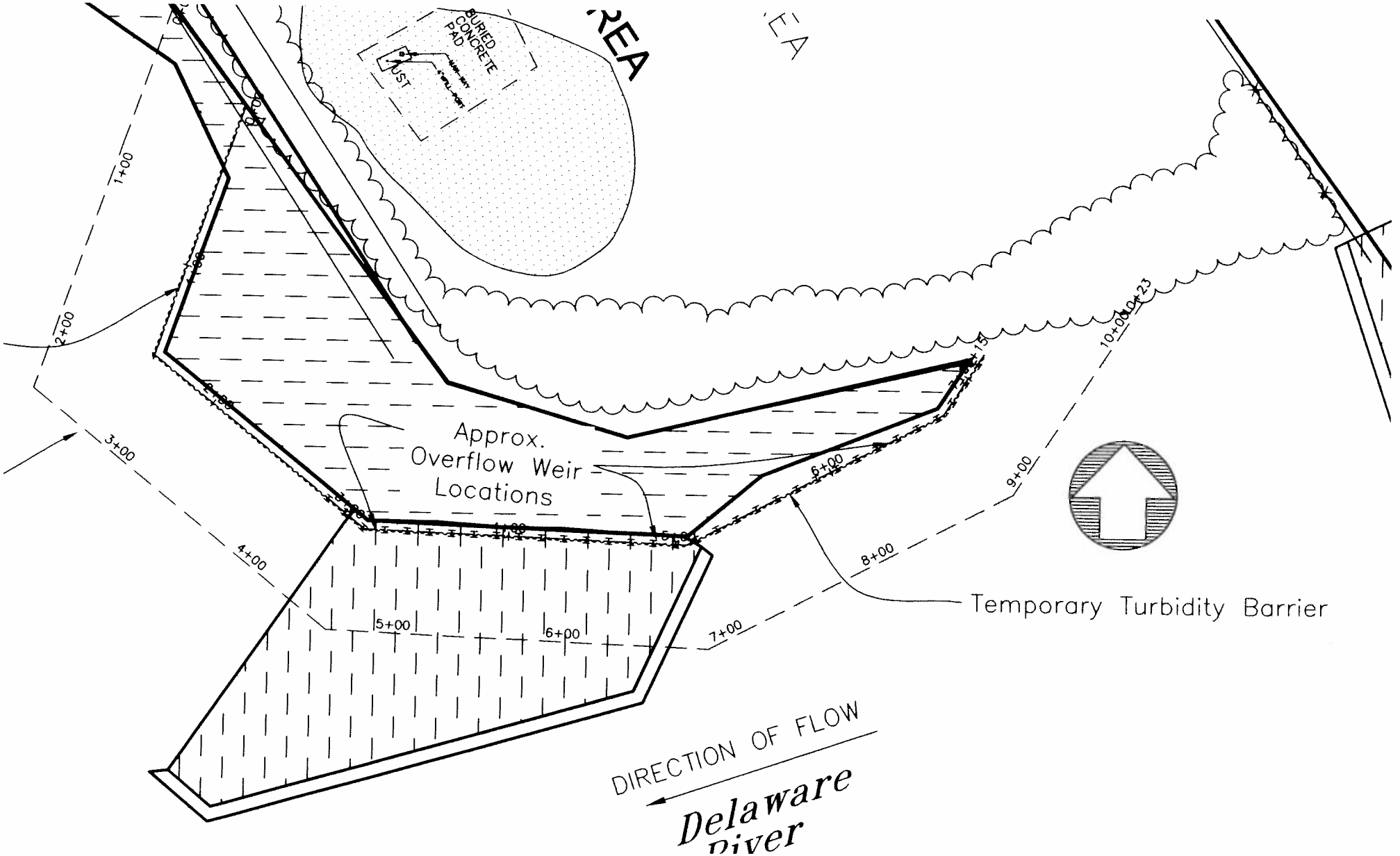
SEVENSON ENVIRONMENTAL SERVICES, INC.

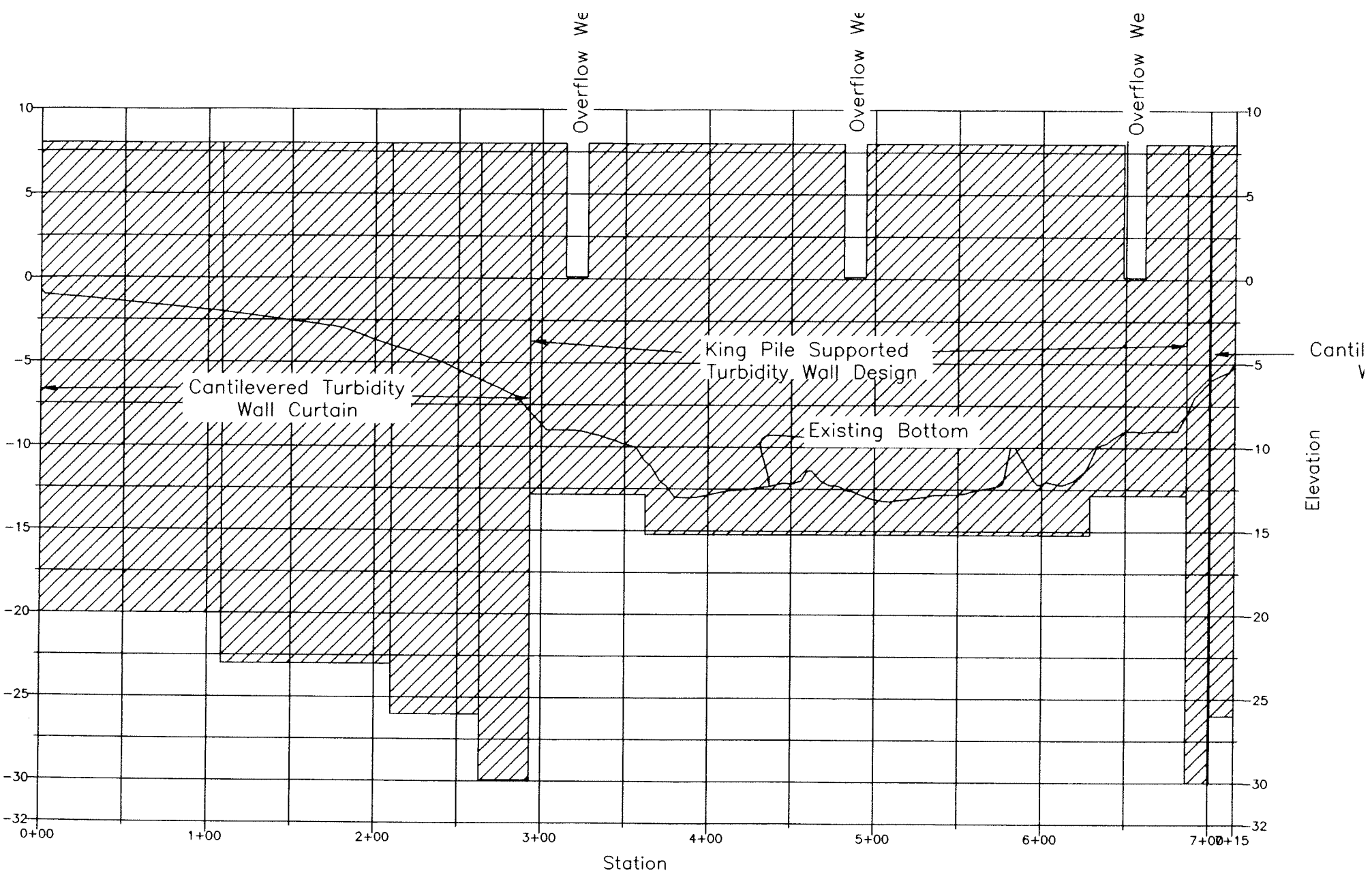
Appendix
D

DATE:	6/16/09
DRAWN BY:	C. Bigelow
CHECKED BY:	J. Pazderski
CAD FILE:	Channel Clearance
SCALE:	as shown

Appendix E:

Temporary Sheeting Weir Detail


BURIED CONCRETE PAD
UST
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
Approx. Overflow Weir Locations
Temporary Turbidity Barrier
DIRECTION OF FLOW
Delaware River



Temporary Turbidity Barrier Profile

Appendix F:

QC Forms / Documents

SEVENSON QUALITY CONTROL REPORT

(Attach Additional Sheets If Necessary)

DATE:

Report No.

PHASE	IDENTIFY DEFINABLE FEATURES OF WORK, LOCATION AND LIST OF PERSONNEL PRESENT		Y = YES / N = NO N/A = NOT APPLICABLE
PREPARATORY			PLANS & SPECS REVIEWED
			SUBMITTALS HAVE BEEN APPROVED
			MATERIALS COMPLY WITH SUBMITTAL
			MATERIALS ARE STORED PROPERLY
			PRELIMINARY WORK IS DONE CORRECTLY
			SAFETY REQUIREMENTS HAVE BEEN MET
			TESTING PLAN HAS BEEN REVIEWED
			WORK METHOD SCHEDULE DISCUSSED
			PRELIMINARY WORK IS DONE CORRECTLY
			SAMPLE HAS BEEN APPROVED / PREPARED
			SAFETY REQUIREMENTS HAVE BEEN MET
INITIAL		TESTING PERFORMED & WHO PERFORMED TEST:	TESTING RESULTS ARE ACCEPTABLE
			WORK IS IN COMPLIANCE WITH CONTRACT
FOLLOW-UP		TESTING PERFORMED & WHO PERFORMED TEST:	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY C.O.B.)	REWORK ITEMS CORRECTED TODAY (FROM REWORK LOG)

REMARKS:

On behalf of the contractor, I certify that this report is complete, correct and all equipment and material used and work performed during this reporting period is in compliance with the contract plans and specifications to the best of my knowledge except as noted above.

AUTHORIZED SITE CQC MANAGER — DATE

QUALITY ASSURANCE REPORT

DATE:

QUALITY ASSURANCE REPRESENTATIVES REMARKS AND / OR EXCEPTIONS TO THE REPORT

QUALITY ASSURANCE REPRESENTATIVE — DATE

SEVENSON ENVIRONMENTAL SERVICES

INITIAL INSPECTION CHECKLIST

OBSERVE THE INITIAL SEGMENT OF THE DEFINABLE FEATURE OF WORK TO ENSURE THAT THE WORK COMPLIES WITH THE CONTRACT REQUIREMENTS.

JOB # PA134 DATE: _____

TITLE: _____ SPEC SECTION: _____

MAJOR DEFINABLE SEGMENT OF WORK: _____

DESCRIPTION AND LOCATION OF WORK INSPECTED: _____

REFERENCE CONTRACT DRAWINGS: _____

A. PERSONNEL PRESENT:

	NAME	POSITION	COMPANY
1.)			
2.)			
3.)			
4.)			
5.)			
6.)			
7.)			
8.)			
9.)			

B. MATERIALS BEING USED ARE IN STRICT COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS:

☐ YES ☐ NO

IF NOT, PLEASE EXPLAIN:

C. PROCEDURES AND/OR WORK METHODS WITNESSED ARE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS:

☐ YES ☐ NO

IF NOT, PLEASE EXPLAIN:

D. WORKMANSHIP IS ACCEPTABLE:

☐ YES ☐ NO

IF NOT, STATE AREAS WHERE IMPROVEMENT IS REQUIRED:

E. ENSURE THAT TESTING HAS BEEN PERFORMED BY AN APPROVED LABORATORY:

☐ YES ☐ NO

F. SAFETY CONCERNS AND CORRECTIVE ACTION TAKEN: _____

_____

QUALITY CONTROL MANAGER

SEVENSON ENVIRONMENTAL SERVICES

PREPARATORY INSPECTION CHECKLIST

JOB # PA134 DATE: _____

TITLE: _____ SPEC SECTION: _____

MAJOR DEFINABLE SEGMENT OF WORK: _____

A. PERSONNEL PRESENT:

	NAME	POSITION	COMPANY
1.)			
2.)			
3.)			
4.)			
5.)			
6.)			
7.)			
8.)			
9.)			

B. SUBMITTALS INVOLVED REVIEW - SPECIFICATIONS AND/OR DRAWINGS:

	NUMBER & ITEM	APPROVED BY SUPERVISING	ADDITIONAL APPROVALS
1.)			
2.)			
3.)			
4.)			
5.)			
6.)			

1. HAVE ALL ITEMS BEEN APPROVED? ☐ YES ☐ NO

2. WHAT ITEMS HAVE NOT BEEN APPROVED?

	NUMBER & ITEM	STATUS
1.)		
2.)		
3.)		
4.)		
5.)		
6.)		

C. ARE ALL MATERIALS ON HAND? ☐ YES ☐ NO

1. ARE ALL MATERIALS ON HAND IN ACCORDANCE WITH THE APPROVALS?

☐ YES ☐ NO

2. ITEMS THAT ARE NOT ON HAND OR IN ACCORDANCE WITH SUBMITTALS:

ITEMS NOT ON HAND:	ITEMS NOT IN ACCORDANCE WITH SUBMITTALS:

D. TESTS REQUIRED IN ACCORDANCE WITH CONTRACT REQUIREMENTS:

SEVENSON ENVIRONMENTAL SERVICES

TEST	PARAGRAPH

E. ACCIDENT PREVENTION PREPLANNING - HAZARD CONTROL MEASURES:

WHAT ARE THE HAZARDS?	CONTROLS FOR HAZARD?

☐ Attached on separate activity hazard analysis

F. EXAMINED THE WORK AREA TO ENSURE THAT THE REQUIRED PRELIMINARY WORK HAS BEEN COMPLETED.

☐ YES ☐ NO

G. DISCUSSED THE PROCEDURES FOR CONTROLLING QUALITY OF THE WORK INCLUDING REPETITIVE DEFICIENCIES.

☐ YES ☐ NO

H. DISCUSSION OF THE INITIAL CONTROL PHASE:

☐ YES ☐ NO

_____
QUALITY CONTROL MANAGER

Appendix G:

Résumé's of Key Personnel

Name:	**MICHAEL A. ELIA**
Education:	BS, Civil Engineering Villanova University, 1974
Position:	**President and Chief Executive Officer**

PROFESSIONAL EXPERIENCE

Mr. Elia is President and Chief Executive Officer of Sevenson Environmental Services, Inc. He has been in charge of all company hazardous waste site remediation operations since the beginning of those operations in 1979. He is a Civil Engineer with project supervisory experience in heavy, highway, and building construction, in addition to having extensive experience in all aspects of hazardous waste site remediation.

Mr. Elia has also served as Officer-in-Charge of all operations for the heavy and highway construction division of Sevenson Construction Corporation.

Mr. Elia has served as project manager on highway, bridge, pipeline, sewer, and treatment plant construction projects. He has acted as project manager on many hazardous waste site remediation projects including remedial work at Love Canal.

Name:	**PAUL C. THOMSON**
Education:	AAS, Civil Engineering Erie Community College, 1977
Position:	**Vice President and Corporate Project Manager**

PROFESSIONAL EXPERIENCE

Mr. Thomson, a Vice-President of Sevenson Environmental Services, Inc., has over 25 years of hands-on experience in implementation of remedial action work plans which incorporate both traditional civil construction/containment techniques as well as innovative technologies. He is responsible for all phases of hazardous waste site remedial construction. In a project's early stages he supervises estimating, planning, engineering, and scheduling efforts. During actual construction, he oversees Project Managers, Engineers, and Superintendents on multiple projects. Mr. Thomson's past project experience includes the following:

- **Former MGP Site Remediation, Sag Harbor, NY**: Corporate Project Manager for the construction of a temporary water treatment system sized at 1,000 gpm; installation of a network of dewatering wells; construction of a subsurface Soil Mix Wall (1,000 lf x 6-17 ft BGS); management of all SMW spoils; connection of WTP effluent to the offshore pipeline; excavate impacted soil and subsurface structures; transportation of impacted materials to an off-site permitted treatment/disposal facility; and site restoration. Impacted soil excavation, solidification/stabilization, stockpiling and loading performed under a temporary fabric structure.

- **Starlight Park Former MGP Site, Bronx, NY**: Corporate Project Manager for the excavation and T+D of contaminated soils from an inactive MGP site. Project also included the installation of Sevenson's Low-Permeability SEAL Wall system around the perimeter of site to control groundwater infiltration. A well point system was installed to control groundwater during excavation operations. All groundwater was collected and pumped to an onsite WWTS sized at 250 GPM for treatment. Community relations was an important component to the project as the site is located in a residential area.

- **Former Brooklyn Borough Gas Works Site OU2 & OU3, Brooklyn, NY**: Corporate Project Manager. The project required the installation of approximately 2100 linear feet of permanent impermeable sheet piling along the shore of Coney Island Creek as well as the mechanical dredging and ex-situ stabilization of approximately 60,000 cy of contaminated sediment. The dredged sediments were processed inside a temporary onsite soil amendment facility prior to the creek being capped. The creek capping operation included the installation of a geo-membrane fabric and the placement of approximately 62,000 cy of a sand and gravel product along the entire creek. In addition, approximately 55,000 cy of MGP impacted soils were excavated and thermally treated offsite as a result of the former coal tar processing plant operations. A NAPL collection trench and associated wells was also installed. The 20 acre (+/) site was then capped with a gravel layer, clay layer, topsoil and then seeded.

- **Former Manufactured Gas Plant Remediation, Savannah, GA:** Corporate Project Manager. Oversaw all aspects of remediation of this former MGP site. The site was comprised of two Areas: Area 1 required the excavation, characterization, and disposal of PAH contaminated soils; Area 2 entailed the remediation of an active city roadway. Roadwork included relocation of utilities; stormwater sewer improvements; excavation, characterization, and disposal of contaminated soils; and reconstruction of 2,000 lf of road. Installation of a sheet-pile cut-off wall was required adjacent to the roadway to prevent contamination migration.

- **Diamond Alkali Superfund Site, Newark, NJ:** Corporate Project Manager for a multifacted project to secure and dewater this site. Work tasks included the excavation, characterization and disposal of 1,000 drums; building and tank decontamination and demolition; installation of a 20,000 VSF Impermix slurry wall connected to a 600 linear feet steel sheeted H-pile reinforced concrete river floodwall; consolidation of 40,000 cy of dioxin contaminated materials from 932 shipping containers; construction of a 6 acre cap consisting of geotextile, gravel gas vent layer, GCL, geomembrane, geonet drainage layer, 36" structural fill layer, and a gravel surface layer. Project also includes a groundwater extraction system with force mains, extraction wells and piezometers connected to a permanent 9,600 SF groundwater treatment plant.

- **Cumberland Bay, Sludge Removal, Plattsburgh, NY**: Corporate Project Manager for hydraulic dredging of 130,000 cy PCB contaminated lake sediments in three defined areas (57 acres); dewater sediments through a bank of plate and frame filter presses; installation O+M of a wastewater system to treat approximately 140 million gallons of filtrate; installation of 1,000' steel sheet piling; deployment of 8,000'+ turbidity curtains; selective shoreline excavation; transportation and disposal of solids; extensive site restoration.

- **Commercial Oil Services Site, Phase 2, Oregon, OH**: Corporate Project Manager for this CERCLA site requiring the solidification of 140,000 cy of oily lagoon sludge; construction of an onsite landfill; placement of solidified material into cell; install RCRA cap; construct leachate treatment facility, collect and treat 2MM gallons of leachate, 2 year O+M facility of water treatment facility.

- **Bristol Landfill Site, Bristol, PA**: Corporate Project Manager for installation of 8,000 lf of slurry wall up to 45' deep; installation of 8,000 lf of bio-polymer collection trench; construction of a 61 acre cap over three landfills; construction and restoration of wetlands.

- **Interim Remedial Measure, Ciba-Geigy Facility, Cranston, RI:** Corporate Project Manager for the installation of a steel sheet pile cofferdam to remove PCB contaminated sediments from the Pawtuxet River in Cranston, RI. Excavated sediments were stabilized prior to offsite disposal.

- **St. Lawrence River Sediment Removal Project, Massena, NY:** Corporate Project Manager for the installation of a 2500 lineal feet kingpile type cofferdam system to dredge and dewater of 25,000 cy of PCB contaminated sediments. Work also included treatment and discharge of over 40 million gallons of water and consolidation and staging of the dewatered sediments.

- **Dalecarlia Reservoir Site, Washington, DC:** Corporate Project Manager for the dredging of 250,000 cubic yards of reservoir sediment utilizing plate and frame equipment. Spoils are shipped off site for beneficial reuse.

- **Mixed Waste Pond Closure, Lima, OH:** Corporate Project Manager for this RCRA closure. Closure activities included construction of 2 onsite disposal cells; excavation and stabilization of 30,000 cubic yards of mixed waste sludge; transfer stabilized material to cells; cap cells and restore site.

- **Lipari Landfill Superfund Site, Pitman, NJ:** Corporate Project Manager responsible for development of submittals, work plans, schedules, and Value Engineering Change Proposals (VECPs). Remedial construction activities included extensive site works the excavation and consolidation of 100,000 cubic yards of soil and sediment from several satellite sites for treatment utilizing low temperature thermal desorbtion and solidification/stabilization, capping construction, and restoration.

- **Marathon Battery Superfund Site, Cold Spring, NY:** Corporate Project Manager responsible for development of submittals, work plans, schedules, and VECPs. The VECPs were a critical component of the cost of the work, since their successful preparation, approval, and implementation was required in order to be able to reduce the anticipated time of performance of the work from approximately 3.5 years to 1.5 years. All VECPs were approved by the owner, and by USEPA, NYSDEC, and USACE.

- **Marsh Remediation, Massena, NY:** Corporate Project Manager for the excavation, dewatering, transportation, and disposal of creek sediments contaminated with PCB.

- **Rhinehart Tire Fire Superfund Site, Winchester, VA:** Corporate Project Manager for the construction of an earthen dam and associated structures, as well as the installation of a storm sewer and the stabilization and regrading of embankments.

- **Montclair Radium Superfund Site, Montclair, NJ:** Corporate Project Manager for the excavation, transport, and disposal of low-level radium-contaminated soils and debris from a residential area. Also for the demolition of four houses and restoration of eight additional homes.

- **New Lyme Landfill Superfund Site, Ashtabula, OH:** Corporate Project Manager for the construction of a 50-acre RCRA cap, the installation of force mains and pump chambers for a 120-gpm treatment plant, and the construction of a wildlife refuge.

- **Picillo Farm Superfund Site, Coventry, RI:** Corporate Project Manager for the excavation, transport, and disposal of soils contaminated with PCB and phenol. Also for the characterization and disposal of laboratory sample bottles.

- **Metaltec/Aerosystems Superfund Site, Franklin, NJ:** Corporate Project Manager for the construction of a tight driven-steel sheeting cell to allow for deep excavation and diversion of groundwater flow at this active industrial site. Contaminated soil was excavated, characterized, and transported to an offsite disposal facility. A temporary treatment system was constructed to treat groundwater.

- **Lang Property Superfund Site, Pemberton, NJ:** Corporate Project Manager for the excavation, characterization, transportation, and disposal of contaminated soils.

- **D'Imperio Property Superfund Site, Hamilton, NJ:** Corporate Project Manager for the excavation, characterization, transport, and offsite disposal of both bulk and drummed wastes.

- **Aidex Superfund Site, Council Bluffs, IA:** Corporate Project Manager for the excavation, characterization, transport, and disposal of contaminated soils; decontamination of all site structures; and operation and maintenance of a temporary onsite water storage and treatment facility.

- **Chem-Dyne Superfund Site, Hamilton, OH:** Corporate Project Manager for the excavation, characterization, transport, and disposal of contaminated soils; the demolition and onsite burial of all plant structures; the installation of a groundwater treatment system; and the installation of an HDPE liner and clay cap.

- **Krysowaty Farm Superfund Site, Hillsborough, NJ:** Corporate Project Manager for the excavation, characterization, transport, and disposal of contaminated soils and buried drums.

- **Falls Street Tunnel Project, Niagara Falls, NY:** Project Manager for a deep-cut excavation to rehabilitate the city's storm and sanitary sewer systems.

- **Gulf Oil Refinery, Toledo, OH:** Project Manager for the dismantling of a 55,000-bpd oil refinery. Remedial tasks included decommissioning of 80 storage tanks, purging of 25 miles of plant pipeline, and removal and disposal of 3,000 yards of asbestos insulation.

- **Northern Ordnance Superfund Site, Fridley, MN:** Project Manager for the excavation and stockpiling of contaminated soils, construction of an onsite vault, placement of contaminated materials into the vault, and closure of the cell by capping.

- **Sylvester Superfund Site (Gilson Road), Nashua, NH:** Project Manager for the construction of a soil-bentonite slurry wall and installation of a clay and HDPE cap.

- **Velsicol Chemical Company Superfund Site, St. Louis, MI:** Project Manager for the dismantling of a 52-acre chemical plant. Remedial activities included excavation, transport, and disposal of contaminated materials, and decommissioning of all plant processing units, facilities, pipelines, and tankage.

- **Love Canal Site (Phases I and II), Niagara Falls, NY:** Project Manager for the installation of the clean-water exclusion system, including clay cap and HDPE liner. A leachate collection system and permanent treatment facility were also constructed.

Name:	**PAUL J. HITCHO, PhD, CIH**
Education:	PhD, Biology, University of Notre Dame, 1970 BA, Biology, St. Vincent College, 1966
Certifications and Honors:	Board-Certified Industrial Hygienist, American Board of Industrial Hygiene National Science Foundation, Predoctoral Trainee, University of Notre Dame National Institutes of Health Postdoctoral Fellow, University of Massachusetts Certificate of Appreciation, US Department of Labor
Position:	**Vice President, Director of Health and Safety**

Dr. Hitcho brings a rich professional background to Sevenson Environmental Services, Inc. He has conducted extensive research as a postdoctoral Fellow at the University of Massachusetts and taught at the university level. He was a field industrial hygienist for the Occupational Safety and Health Administration for 3 years, and later served as supervisor of industrial hygiene for the Pittsburgh Area Office. While serving as the head of the Industrial Hygiene Department for the United Steelworkers of America, Dr. Hitcho acted as liaison between the union and the coal carbonization (coking) industry and related chemical industries. He is recognized as a world authority in this field by the International Agency for Research on Cancer (IARC). The IARC monographs developed while he was an active participant are cited by OSHA today in that agency's hazardous communications standard 29 CFR 1910.120. Dr. Hitcho also interfaced with pesticide and herbicide manufacturers to conduct occupational health studies and to develop hazard analyses for some of the processes in this industry. Since 1986, Dr. Hitcho has served as the Director of Occupational Health and Safety for Sevenson. On every project the firm has undertaken since then, he has developed, implemented, reviewed, and evaluated the project-specific worker health and safety plans, as well as overseeing the medical monitoring of all field employees. Dr. Hitcho supervises a staff of 42 Site Health and Safety Officers. He has overseen the health and safety aspects of all Sevenson's projects

PROFESSIONAL EXPEREINCE

- Teaching Assistant: University of Notre Dame – 1966-1968
- National Science Foundation Trainee: University of Notre Dame – 1968 – 1970
- Post Doctoral Research Fellow: University of Notre Dame – 1970 – 1971
- National Institute of Health Post Doctoral Fellow: University of Massachusetts, Amherst, MA – 1971 – 1974
- Field and Supervisory Industrial Hygienist, OSHA, Pittsburgh Sun Office – 1974 – 1979
- Technician and Assistant Department Head – Health and Safety: United Steelworkers of America – 1979 – 1986
- Director of Occupational Health and Safety and Vice President: Sevenson Environmental Services, Inc., Niagara Falls, NY: 1986 to Present

Name:	**FRANK A. FRACASSI**
Education:	AAS, Civil Engineering Technology Erie Community College, 1973
Project Assignment:	**Vice President /Project Manager / Lead Superintendent**

PROFESSIONAL EXPERIENCE

Mr. Fracassi is a Vice President, Project Manager, and Lead Superintendent for Sevenson Environmental Services, Inc. In his more than 30 years experience in heavy civil and remedial construction projects, he has served in a variety of capacities including estimator, surveyor, superintendent, and project manager. With his background in bridges, buildings, roads, sewers, and treatment plant construction, Mr. Fracassi is a key field person for the successful completion of difficult projects. Mr. Fracassi is responsible for all project engineering and construction activities, as well as for negotiations and interfacing with clients. In addition to his field responsibilities, Mr. Fracassi administers Sevenson's equipment procurement and maintenance program. Mr. Fracassi's experience has included the following:

- **CWM Chemical Services, Model City, NY:** Corporate Project Manager for stabilization of 90,000 cy of VOC and SVOC sludges from inactive lagoons, from design phase through construction of multiple soil and geosynthetic capping systems. Several lagoons were stabilized within temporary enclosures using Air Pollution Control Systems.

- **Former Coal Tar Processing Facility, Everett, MA:** Lead Superintendent for construction of an in-water low-permeability steel sheet-pile Confined Disposal Facility (CDF). Mechanically dredge and placed approximately 100,000 cy of sediment within the CDF and stabilized the material in place to a depth of 45' using specialized mixing equipment.

- **Solidification Pilot Study, Fairfield, AL:** Lead Superintendent for onsite insitu stabilization project using shallow soil mixing auger equipment and conventional excavation equipment to evaluate results using multiple design mixes and additives.

- **Frontier Chemical Pendleton Site, Pendleton, NY:** Lead Superintendent for the dewatering and treatment of 40 million gallons of water from Quarry Lake; excavation and stabilization of a 15,000 cy lake sediment; installation of an 8-acre cap; installation of a 1,300' collection trench and construction of a leachate treatment plant.

- **Pettit Flume Site Phase II, North Tonawanda, NY:** Lead Superintendent for the excavation, stabilization and bagging of contaminated soils from a Niagara River cove. Work also included treatment of contaminated water and installation of permanent steel-sheeting cutoff wall.

- **Gill Creek Site, Niagara Falls, NY:** Lead Superintendent for the excavation and offsite disposal of contaminated creek sediments. Project involved construction of sheeting and earth-fill cofferdam, installation of a bypass pumping system, and installation of an onsite waste water treatment plant.

- **New York State Power Authority Bridge Rehabilitation, Lewiston, NY:** Senior Project Manager for rehabilitation and reconstruction of the concrete deck surface and repairs to bridge substructure.

- **Route 5 Skyway Rehabilitation Project, Buffalo, NY:** Senior Project Manager for rehabilitation of all bridge pier substructures and removal and replacement of concrete.

- **Hyde Park Landfill Site, Niagara Falls, NY:** Senior Project Manager for the installation of a deep-cut leachate collection system requiring protective shoring, drainage improvements, and cap modifications.

- **Black and Bergholtz Creek Remediation and Landfill Construction, Love Canal (NYSDEC), Niagara Falls, NY:** Senior Project Manager for extensive creek remediation; construction of a secure landfill and drum storage building; transfer of 2,000 drums into the storage facility; and closure of the landfill.

- **RCRA Impoundment Closure, Ponce, PR:** Project Manager for the solidification of 60,000 cy of Dripolene sludge, placement of solidified materials into an onsite landfill, and construction of a 25-acre clay cap.

- **FMC Corporation, Middleport, NY:** Project Manager for the installation of a leachate collection system, and construction of a cap over the plant facility.

- **Niagara Recycling, Niagara Falls, NY:** Project Manager for the installation of a leachate collection system and runoff diversion channel, and construction of a sanitary landfill cap.

- **NYSDOT, Albany, NY:** Project Manager for the demolition of a roadway bridge deck and construction of replacement structures, deck, and roadway.

- **NYSDOT, Schenectady, NY:** Project Manager for the demolition of bridge deck and construction of replacement structures, decking, and roadway.

- **SCA Chemical Services, Inc., Model City, NY:** Project Manager for the construction of a 12-acre secure landfill.

- **Facilities for Flow Reduction Project, Niagara Falls, NY:** Project Manager for the installation of a sanitary interceptor sewer to separate storm and sanitary waste flows.

- **Lake Ontario Ordnance Works (USDOE), Lewiston, NY:** Project Manager for the excavation, stockpiling, and weather conditioning of low-level radioactive soil; construction of retention ponds and a residual dewatering system; and installation of an interim clay cap over stockpiled materials.

- **Love Canal Site, Niagara Falls, NY:** Project Manager for the installation of a leachate collection and treatment system; construction of a clean-water exclusion system; and consolidation of offsite waste onto the landfill.

Name:	**JAMES E. PAZDERSKI**
Specialized Training:	40 Hour, 8 Hour Supervisory, and 8 Hour Refresher HAZWOPER Training U.S. Army Corps of Engineers CQM Training DuPont - Safety Skills Audit Training American Heart Association - CPR/First Aid Training
Education:	B.A., Business, Management and Economics: Concentration - Construction Management Empire State College, 1999
Position:	**Corporate Project Manager**

PROFESSIONAL EXPERIENCE

Mr. Pazderski has more than 19 years experience with Sevenson working in remedial construction. As a project manager, he is responsible for: development and management of project controls and work plans; coordination of cost-progress targets with production; development and maintenance of progress schedules; and management of subcontractor schedules and quality-of-work. While at Sevenson, Mr. Pazderski has served in various positions of increasing responsibility on projects including health and safety officer, project engineer, estimator, and QA/QC engineer. His project experience includes: excavation and earthwork; recovery and treatment systems installation; sediment remediation and restoration; plant decommissioning and demolition; trenching; slurry wall installation; steel sheet pile systems; radiation hazards; dredging and dewatering; and solidification and stabilization. His specific project experience has included the following:

- **Confidential Client, Bedford – Indiana**: Corporate Project Manager and Lead Estimator for the restoration of a 50 acre flood plain in Bedford, Indiana from May of 2008 - Present. Work on the project included the following: dewatering, excavation, and grading of approximately 30,000 cuyds of existing soils to prepare the site subgrade; the diversion of an active creek channel to facilitate the installation of nearly 1 mile of new creek bed, the import and placement of approximately 75,000 cuyds of common fill; 70,000 cuyds of organic clay; 25,000 cubic yards of various creek substrates; and 35,000 cuyds of topsoil; installation of various wet lands seed mixes and 15,000 bare root seedlings. Project responsibilities included oversight and management of all project operations; procurement of equipment and materials; interfacing with the client and engineer as necessary to address project related issues; coordination of subcontractors; project cost tracking and invoicing; and to provide operations support as necessary for the site superintendent.

- **Confidential Client, Bedford, Indiana:** Corporate Project Manager and Lead Estimator for a strategic excavation of both TSCA and Non TSCA PCB soils at depths of greater than 20' from July to November of 2008. Work on the project included the installation of more than 500 linear feet of 24" and 36" bypass sewer line and 5 manholes at depths of up to 25'; the installation of approximately 3000 linear feet of 8" HDPE effluent line between the excavation and the on site WWTP to control contaminated excavation water; the strategic excavation of 6,500 cuyds of non TSCA material; the excavation of approximately 1, 000 cuyds of TSCA soils; the transport and placement of TSCA soils in an on site vault and

off site as required in a licensed disposal facility; and backfill and restoration of the work area as appropriate. Project responsibilities included oversight and management of all project operations; procurement of equipment and materials; interfacing with the client and engineer as necessary to address project issues; coordination of subcontractors; project cost tracking and invoicing; and to provide operations support as necessary to the site superintendent.

- **Confidential Client, Sleepy Hollow, NY**: Corporate Project Manager for a high visibility Brownfield Cleanup Project in Sleepy Hollow, New York. Work on the project required the set up and operation of a 100 gpm temporary waste water treatment system; concrete demolition and removal of more than an acre of concrete slabs; the installation of 525 lf of 55' long AZ26 sheet piling using a 125 ton truck crane and APE vibratory impact hammer; the excavation and chemical fixation of approximately 11,000 tons of metals contaminated soils using Sevenson's patented MAECTITE® treatment process; the excavation of approximately 11,000 tons of petroleum contaminated soils from below the ground water table; and the loading, transport and disposal of 20,000+ tons of non hazardous soils via rail car to a licensed disposal facility. Project responsibilities included oversight and management of all project operations; procurement of equipment and materials; interfacing with the client, engineer, the Mayor of Sleepy Hollow, and the local home owner association president to address project issues as necessary; coordination of subcontractors; project cost tracking and invoicing; and to provide operations support as necessary to the site superintendent.

- **Confidential Client, Bedford, IN**: Project Manager and Lead Estimator for a residential soils and sediment remediation project from July 2003 to present. Work on the project required clearing and grubbing; installation of water by pass systems; excavation, transport and disposal of an estimated 167,000 tons of PCB contaminated soils and sediment; and restoration of the creek beds and flood plain areas. A second phase of this project required the construction of a 2.5 acre multi layer TSCA vault and the excavation and handling of an estimated 200,000 cubic yards of material. Upon completion of the excavation operations, a multi-layer landfill cap is scheduled to be installed. Job duties included oversight and management of project operations; procurement of equipment and materials; interfacing with the client, engineer and homeowners to address project issues as necessary, coordination of subcontractors; project cost tracking; and to provide operations support as necessary for the site superintendent.

- **Confidential Client, Defiance, OH**: Project Manager and Lead Estimator for a landfill capping and closure project from April 2002 - January 2003. Work on the project required clearing and grubbing; excavation, relocation and consolidation of approximately 100,000 cubic yards of material; installation of an 1,800 lf leachate collection system with associated manholes and pump stations; decommissioning and reinstallation of groundwater monitoring wells; decommissioning, removal and reinstallation of 13 KV overhead power lines; treatment and discharge of more than 2,000,000 gallons of contaminated water; installation and removal of temporary steel sheeting; and the installation of a 10 acre, multi layer RCRA cap. Job duties included oversight and management of project operations; procurement

of equipment and materials; interfacing with the client and engineer at weekly progress meetings; coordination of subcontractors; and project cost tracking.

- **Whitmoyer Laboratories Superfund Site, Myerstown, PA**: Project Engineer for Operable Unit 3 - Phase I and II from October 1999 - November 2001: Phase I of the project involved the strategic excavation, loading and off-site transportation of more than 20,000 cubic yards of arsenic contaminated soil and sediment and the backfill and restoration of the excavation areas. Phase II of the project involved building, slab, and foundation demolition, material relocation and grading, and the installation of a two foot thick soil cover over a twenty two acre site. Job duties included: equipment and material requisitions; completion of hazardous waste manifests; layout of ground elevations; interfacing with clients and regulators at weekly progress meetings; record keeping and inventory of hazardous waste shipments; project cost management and payroll; and operations support as necessary for the Site Superintendent.

- **Newport Superfund Site, New Castle, Delaware**: Project Engineer for multiple phases of work from March 1999 - September 1999. The river remediation phase of the project involved the installation of more than 2,000 linear feet of steel sheeting and the mechanical dredging and onsite disposal of more than 10,000 cyds of metals contaminated sediments from three different locations along the banks of the Christina River. The vertical barrier phase of the project involved the installation of approximately 1,700 linear feet of low permeability steel sheeting. Job duties included: conducting weekly progress meetings with client and regulatory agency representatives; daily project cost accounting; weekly payroll and batch reporting; equipment and material requisitions; daily progress reports; coordination of flight schedules and living arrangements for the crew; project safety audits; and operations support as required for the site superintendent.

- **Whitmoyer Laboratories Superfund Site, Myerstown, Pennsylvania**: Project Engineer for Operable Unit 5 - Consolidated Lagoon Excavation from September 1998 - January 1999. The project involved the strategic excavation and loading of 20,000 tons of arsenic contaminated sludges and soils. Job duties included: completion of hazardous waste manifests; layout of excavation grids; interfacing with both the client and regulators at weekly progress meetings; recordkeeping and inventory of hazardous waste shipments; project cost management and payroll; and the coordination of flight schedules and living arrangements for the crew.

- **Whitmoyer Laboratories Superfund Site, Myerstown, Pennsylvania**: Site Health and Safety Officer for the multiple phases of work from May 1994 - June 1998 which included erection of a temporary building structure, facility decontamination, decommissioning and demolition; material excavation and transport, material transferring, repackaging and disposal. Real time and low volume air sampling was performed in and around active work areas as well as at the site perimeter. Levels B, C, and Modified C were the required levels of protection.

- **B.P. Chemical, Lima Ohio**: Site Health and Safety Officer for landfill cell

construction, waste water treatment plant set up, chemical treatment plant installation, material excavation, treatment and staging. Real time and integrated monitoring was conducted in active work areas and around the site perimeter. Modified C and Level C protection was required.

- **Summit National Superfund Site, Deerfield, Ohio**: Site Health and Safety Officer for the project which included set up of a thermal treatment unit, installation of a leachate collection system with depths up to 40', drum excavation and over packing, material handling. Real time air monitoring was performed in active work areas and around the site perimeter. Confined space monitoring was required daily. Level B, Level C and Modified C were the required levels of protection.

- **Marathon Battery Site, Cold Spring, New York**: Site Health and Safety Officer for excavation, dredging, dewatering, stabilization, transport and disposal of material. Real time monitoring was required in active work areas as well as around the site perimeter. Level C and Modified Level C were the required levels of protection.

- **Confidential Client, Niagara Falls, New York**: Site Health and Safety Officer for the dewatering, excavation and stabilization of creek sediments. Real time air monitoring was required in active work areas and around the site perimeter. Level B, Level C and Modified C were the required levels of protection.

- **Madison Wire Site, West Seneca, New York**: Site Health and Safety Officer for the site clearing, excavation, transport and disposal of contaminated soils. Real time and low volume air sampling were conducted in active work areas and around the site perimeter. Level C and Modified Level C were required levels of protection.

- **Montclair Radium Site, Montclair, New Jersey**: Site Health and Safety Officer for total and partial demolition of homes, soils excavation, transport and disposal. Real time and low volume air monitoring were performed in active work areas and around the site perimeter. Level C and Modified C were the required levels of protection.

- **Confidential Client, Massena, New York**: Site Health and Safety Officer for landfill capping construction work. Real time particulate readings were conducted around the landfill perimeter. Level D was required level of protection.

- **Groveland Correctional Facility, Sonea, New York**: Site Health and Safety Officer for the containerization, decontamination, sampling and transporting of pesticide/herbicide, low level rad, and other miscellaneous waste. Level C was the required level of protection.

Name:	**MICHAEL W. MUTH**
Education:	BS, Interdisciplinary Engineering and Management Clarkson University, 2003
Certifications:	40 Hour HAZWOPER Certificate with 8 Hour Refresher US Army Corps of Engineers Construction Quality Management
Project Assignment:	**Project Manager/Project Engineer**

PROFESSIONAL EXPERIENCE

Mr. Muth serves as a Project Manager and Project Engineer for Sevenson Environmental Services, Inc. As Project Manager, he is responsible for the development and management of project controls and work plans; development and maintenance of progress schedules; and management of subcontractor schedules and quality-of-work. As a Project Engineer, Mr. Muth ensures proper execution of procedures, specifications, and standards; assists the Project Manager in duties relating to project correspondence, specifications and drawing interpretations; reviews material quantities, procedural submittals and other project documentation; maintains computer log of construction management documents; and supports project management through preparation of construction estimates and schedules. Mr. Muth's project experience includes the following:

- **Starlight Park Former MGP Site, Bronx, NY**: Project Manager for the excavation and T+D of contaminated soils from an inactive MGP site. Project also included the installation of Sevenson's Low-Permeability SEAL Wall system around the perimeter of site to control groundwater infiltration. A well point system was installed to control groundwater during excavation operations. All groundwater was collected and pumped to an onsite WWTS sized at 250 GPM for treatment. Community relations was an important component to the project as the site is located in a residential area.

- **Silver Lake Sediment Capping Pilot Study, Pittsfield, MA:** Project Manager for pilot study project to install a sub-aqueous cap comprised of multiple thin layer lifts in the lake environment. Cap components included geotextile fabrics and a variety of materials for a total thickness of 14 inches over a 1 acre portion of the lake bottom. Sevenson design and built the installation equipment. Performed bank soil removal and restoration along the pilot study test area. Installed an armor stone protection layer and habitat gravel layer along the shoreline of the test area and habitat gravel layer.

- **Floodplains PCB Soils Removal, Multiple Phases, Pittsfield, MA:** Project Manager for remediation of several floodplain properties located along the Housatonic River. Project required Sevenson to excavate, stabilize, and transport soils and sediments from contaminated areas and restore disturbed areas with a variety of materials and plantings. Installation of Erosion Control materials and hydro-seed was also required. Site preparation including clearing and grubbing of wooded areas and construction of access roads.

- **Housatonic River PCB Sediment Removal, Multiple Phases, Pittsfield, MA**: Project Manager for the excavation of PCB contaminated sediments and bank soils from 4,400 LF of Housatonic River. Installation of sectional sheet piling cells to dewater river for excavation and transport of contaminated material to onsite stockpile. Design, installation, operation and maintenance of a temporary WWTP to treat VOCs, SVOCs, PCBs, Zinc and oil and grease at a maximum rate of 500 gpm. WWTP components include equalization tanks, carbon vessels and sand filtration tanks. Extensive restoration of river sections and banks including riprap, topsoil and bioengineered structures. Installation of dam and bypass piping to excavate some areas of river in the dry.

- **Raquette River Removal Action, Massena, NY**: Project Engineer for removal of PCB sediment and soils along Raquette River. Sevenson installed a bypass pump system and steel sheet piling containment cells to dewater area. Water generated from remediation activities was pumped to the facility WWTS for treatment. Soils were excavated, transported and disposed of offsite. Sediments were vacuum dredged from riverbed, gravity dewatered, stabilized and temporarily stored onsite. An armour cap was installed in riverbed bottom.

- **Inactive Lagoons, Massena, NY**: Project Engineer for solidification of 7,000 cy PCB contaminated sludge from two (2) inactive lagoons. Solidification operations were conducted in an enclosed structure to contain dust and odors. Perimeter soils were consolidated. Demolition of weirs and stormwater structures and piping was required. Lagoons restored to "operational state" and included backfill, placement of an underdrain system and installation of an HDPE liner.

Name:	**WAYNE A. KOSTUK**
Project Assignment:	**Superintendent**

PROFESSIONAL EXPERIENCE

Mr. Kostuk, a Superintendent for Sevenson Environmental Services, Inc., has more than 25 years experience in general building and remedial construction projects. Specific to remedial action and site restoration, he has worked on a variety of projects which required earthwork and capping construction; sediment remediation, installation of collection/recovery treatment systems; solidification and stabilization; and steel sheeting and protective shoring systems. As a Superintendent, Mr. Kostuk is responsible to implement the construction schedule working in conjunction with the project manager; supervise and oversee all field construction activity; and determine equipment needs. Mr. Kostuk's project experience has included:

- **Release Abatement Measure – Former Malden Tar Plant, Malden, MA**: Superintendent for the removal action which required the excavation, processing, transport and disposal of impacted soil; by-pass pumping and excavation of river sediments; and restoration of all disturbed areas which includes backfill, plantings and pavement installation.

- **Former Brooklyn Borough Gas Works Site OU2 & OU3, Brooklyn, NY**: Project Superintendent. The project required the installation of approximately 2100 linear feet of permanent impermeable sheet piling along the shore of Coney Island Creek as well as the mechanical dredging and ex-situ stabilization of approximately 60,000 cy of contaminated sediment. The dredged sediments were processed inside a temporary onsite soil amendment facility prior to the creek being capped. The creek capping operation included the installation of a geo-membrane fabric and the placement of approximately 62,000 cy of a sand and gravel product along the entire creek. In addition, approximately 55,000 cy of MGP impacted soils were excavated and thermally treated offsite as a result of the former coal tar processing plant operations. A NAPL collection trench and associated wells was also installed. The 20 acre (+/) site was then capped with a gravel layer, clay layer, topsoil and then seeded.

- **Housatonic River PCB Sediment Remediation, Pittsfield, MA**: Project Superintendent at this highly visible Superfund site. Sevenson is contracted to excavate PCB contaminated sediments and bank soils from 4,400 LF of Housatonic River. Installation of sectional sheet piling cells to dewater river for excavation and transport of contaminated material to onsite stockpile. Design, installation, operation and maintenance of a temporary WWTP to treat VOCs, SVOCs, PCBs, Zinc and oil and grease at a maximum rate of 500 gpm. WWTP components include equalization tanks, carbon vessels and sand filtration tanks. Extensive restoration of river sections and banks including riprap, topsoil and bioengineered structures.

- **Saltville Disposal Superfund Site, OU2, Saltville, VA**: Project Superintendent for the remediation of Ponds 5 and 6 requiring extensive earthwork and construction of a 120 acre multi-layer cap. Additional work tasks included the installation of an upgradient groundwater interceptor system comprised of 10,000 LF force mains and pump chambers.

- **Agway/Kress Site Landfill, Acton, MA**: Superintendent for the installation of a RCRA cap. The cap included a 40 ml HDPE liner, clay, topsoil and seed. Work tasks required drainage improvements and waste excavation and consolidation.

- **South Jersey Clothing Superfund Site, Minolta, NJ**: Superintendent for construction of a 500 gpm (maximum) water treatment plant. System components included installation of extraction, injection and monitoring wells; SVE system; and 5,000 LF of 6-inch dual containment pipe.

- **Gill Creek Remediation, Niagara Falls, NY**: Superintendent for this creek remediation project which required the construction of a steel sheeting and earth fill cofferdam; installation of a by-pass pumping system; excavation, stabilization and offsite disposal of sediments; and construction, O+M of a 500 gpm WWTF.

- **Purolator Products Site, Elmira, NY:** Site Superintendent for the excavation, characterization, transport, and disposal of creek sediment; install a one-acre cap over a landfill; and install, operate and maintain a temporary groundwater recovery and treatment system.

- **Frontier Chemical Pendleton Site, Pendleton, NY:** Superintendent for the dewatering of 40 million gallon Quarry Lake. Excavate and stabilized 35,000 cy lake sediment. Excavate 20,000 cy lake perimeter soils; place soils and stabilized sediments under cap. Construct 8-acre multi-layer cap. Construct 1,300 lf collection trench and leachate treatment plant.

- **Allen Mills Wall, Hudson Falls, NY:** Superintendent for construction of haul road into gorge; installation of permanent dam with stop log; and installation of new concrete retaining wall for mill and tunnel.

- **Pettit Flume Site Phase II, North Tonawanda, NY:** Superintendent for excavation, stabilization, and bagging of contaminated soils from Niagara River cove. Project also involved onsite treatment of contaminated water, and installation of permanent steel-sheeting cutoff wall.

- **Hyde Park Landfill Site, Niagara Falls, NY:** Superintendent for landfill capping and closure involving approximately 110,000 cy of soil cover material and 200,000 sy of geosynthetics on a 20-acre site. Work also included improvements to the forcemain system.

- **PCB Remediation (Multiple Contracts) New York State:** Superintendent for removal of PCB-contaminated pipe and soil; backfill pipe trench with cement-bentonite grout; installation of concrete bulkhead; and removal, dewatering, and solidification of PCB-contaminated sediment from a tunnel.

- **Saltville Disposal Superfund Site, Interim Action, Saltville, VA:** Superintendent for construction of a pump station and water treatment facility.

- **Madison Wire Site, West Seneca, NY:** Superintendent for remediation project requiring construction of access roads, staging areas, and decon facilities, as well as the excavation, characterization, transport, and disposal of bulk soils.

- **Pettit Flume Site, North Tonawanda, NY:** Superintendent for the installation of a low permeability sheet pile system, concrete storm sewer piping, and two temporary structures to store excavated sediments for future treatment.

- **The F and K Area Remediation, Niagara Falls, NY:** Superintendent for the installation of 600 lf of HDPE piping and manholes to replace deteriorated sewers.

- **102nd Street Site, Niagara Falls, NY:** Superintendent for the excavation, transportation, and placement of contaminated soils to an onsite landfill.

- **Interim Remedial Measures, Model City, NY:** Superintendent for the construction of a recovery trench and conveyance system which included wells and piping to a treatment plant.

- **Pine and Tuscarora Road Site, Niagara Falls, NY:** Superintendent for the construction of a new creek channel, installation of an HDPE liner and clay cap, and construction of a slurry wall.

- **Bioremediation of Oil Tar Site, Port Stanley, Ont.:** Superintendent for the excavation, placement, and treatment of contaminated soils, including construction of a clay-lined 5-acre bermed treatment cell.

- **Love Canal Site, Niagara Falls, NY:** Surveyor for the installation of a leachate collection and treatment system; construction of the clean-water exclusion system; and consolidation of offsite waste into the landfill.

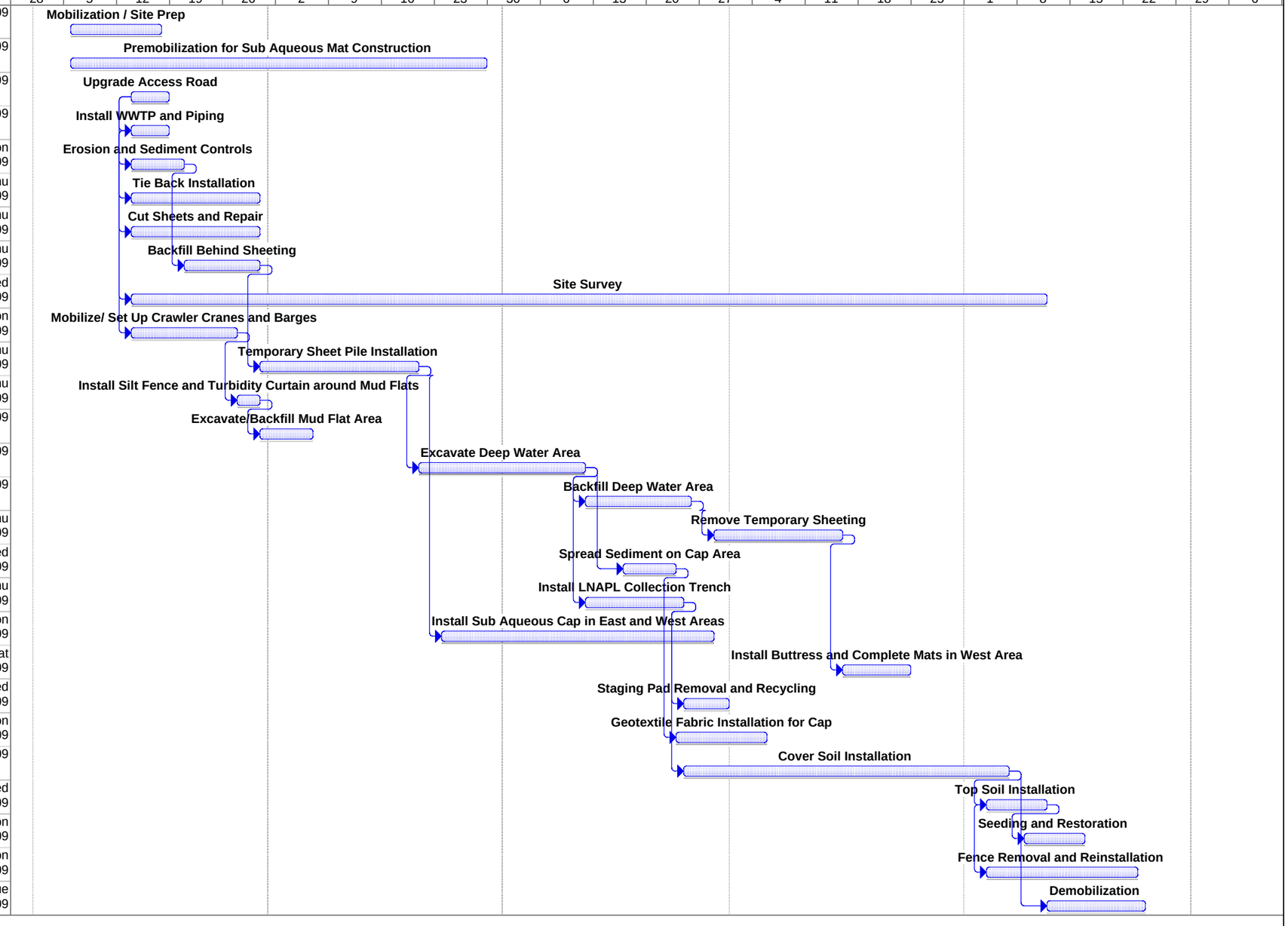
- **The Comfort Inn, Niagara Falls, NY:** Superintendent for all concrete construction on a 120-unit hotel and 60,000-sf retail complex.

- **Lake Ontario Ordnance Works Site, Lewiston, NY:** Surveyor for the remediation of a site contaminated by radioactive wastes from the Manhattan Project and other early atomic energy programs. Work included excavation of 36,000 cy of radioactive soils for stockpiling; installation of two interim clay caps; construction of retention ponds; and installation of a residual vacuum dewatering system.

- **Black and Bergholtz Creek Remediation and Landfill Construction, Love Canal (NYSDEC), Niagara Falls, NY:** Superintendent for extensive creek remediation; construction of a secure landfill and drum storage building; transfer of 2,000 drums into the storage facility; and closure of the landfill.

Metal Bank Remediation
Philadelphia, Pennsylvania

Task Name	Duration	Start	Finish
Mobilization / Site Prep	10 days	Mon 7/6/09	Fri 7/17/09
Premobilization for Sub Aqueous Mat Construction	44 days	Mon 7/6/09	Sat 8/29/09
Upgrade Access Road	5 days	Tue 7/14/09	Sat 7/18/09
Install WWTP and Piping	5 days	Tue 7/14/09	Sat 7/18/09
Erosion and Sediment Controls	6 days	Tue 7/14/09	Mon 7/20/09
Tie Back Installation	14 days	Tue 7/14/09	Thu 7/30/09
Cut Sheets and Repair	14 days	Tue 7/14/09	Thu 7/30/09
Backfill Behind Sheeting	8 days	Tue 7/21/09	Thu 7/30/09
Site Survey	95 days	Tue 7/14/09	Wed 11/11/09
Mobilize/ Set Up Crawler Cranes and Barges	11 days	Tue 7/14/09	Mon 7/27/09
Temporary Sheet Pile Installation	17 days	Fri 7/31/09	Thu 8/20/09
Install Silt Fence and Turbidity Curtain around Mud Flats	3 days	Tue 7/28/09	Thu 7/30/09
Excavate/Backfill Mud Flat Area	6 days	Fri 7/31/09	Thu 8/6/09
Excavate Deep Water Area	17 days	Fri 8/21/09	Fri 9/11/09
Backfill Deep Water Area	11 days	Sat 9/12/09	Fri 9/25/09
Remove Temporary Sheeting	14 days	Tue 9/29/09	Thu 10/15/09
Spread Sediment on Cap Area	5 days	Thu 9/17/09	Wed 9/23/09
Install LNAPL Collection Trench	10 days	Sat 9/12/09	Thu 9/24/09
Install Sub Aqueous Cap in East and West Areas	29 days	Mon 8/24/09	Mon 9/28/09
Install Buttress and Complete Mats in West Area	7 days	Fri 10/16/09	Sat 10/24/09
Staging Pad Removal and Recycling	5 days	Fri 9/25/09	Wed 9/30/09
Geotextile Fabric Installation for Cap	9 days	Thu 9/24/09	Mon 10/5/09
Cover Soil Installation	34 days	Fri 9/25/09	Fri 11/6/09
Top Soil Installation	6 days	Wed 11/4/09	Wed 11/11/09
Seeding and Restoration	7 days	Mon 11/9/09	Mon 11/16/09
Fence Removal and Reinstallation	15 days	Wed 11/4/09	Mon 11/23/09
Demobilization	10 days	Thu 11/12/09	Tue 11/24/09



Project: Metal Bank Project Schedule-
Date: Fri 6/26/09
Based on SIX Days @ 10 hours

Task — Progress — Summary — External Tasks — Split
Split — Milestone — Project Summary — External MileTask

Sevenson Environmental Services, Inc.